

Parsons (Usher)

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**FISKE FUND PRIZE DISSERTATION---No. VII.**

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**ON SPINAL DISEASES,**  
**BY USHER PARSONS, M.D.**  
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THESE TROIS DISSERTATIONS NO. VII

DE L'ART DE LA MATHÉMATIQUE

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NO. VII.]

[SEPTEMBER, 1842.

**FISKE FUND PRIZE DISSERTATIONS OF THE
RHODE ISLAND MEDICAL SOCIETY.**

SPINAL DISEASES,

BOTH STRUCTURAL AND FUNCTIONAL,

THEIR

CAUSES AND TREATMENT.

BY

USHER PARSONS, M.D.

"Vestræ petitioni respondeo diligenter."

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At an adjourned annual meeting of the Rhode Island Medical Society held at Providence on the 8th day of September, 1842, the Trustees of the Fiske Fund announced that they had awarded to the author of the Dissertation bearing the motto, "*Vestra petitioni respondeo diligenter*," the premium of one hundred dollars by them offered for the best dissertation on the question,

"What are the Causes, Character and Nature of the Diseases of the Spine, both structural and functional; and what is the best mode of Treatment to be employed in each?"

Upon breaking the seal of the accompanying packet, they ascertained its author to be, Usher Parsons, M.D., of Providence.

In awarding the premium to this Dissertation, neither the Trustees nor the Rhode Island Medical Society hold themselves responsible for the doctrines herein inculcated, treatment recommended, or opinions advanced.

Attest,

THOMAS H. WEBB, *Secretary.*

RICHMOND BROWNELL, } *Trustees.*
THEOPHILUS C. DUNN, }

DISSERTATION.

“What are the Causes, Character and Nature of the Diseases of the Spine, both Structural and Functional; and what is the best mode of Treatment to be employed in each?”

THE number and variety of spinal diseases, and their increasing frequency, demand of the medical profession an investigation of their nature and causes, and the best means of prevention and cure.

Consisting as they do of structural as well as functional diseases, it is necessary to commence our subject with a brief view of the anatomy and physiology of the spine. In doing this, we behold what is everywhere presented in animal mechanism, a wonderful display of creative skill, in the form and adaptation of every part to the office it was designed to fulfil. In the first place, we observe the framework, combining the essential properties of *strength*, for firmness of muscular attachment and action, with the least possible volume and weight of substance,—of *flexibility*, for every necessary variety of motion and attitude, with effectual guards against dislocation,—of *security*, for the lodgement and protection of the delicate cords or channels of sensation and motion, amid all the concussions to which the body is liable, yet providing at every joint a safe passage to the nerves leading from the cerebro-spinal axis to the sentient extremities. In the next place, we observe an arrangement of tendinous cords and muscles attached to its processes, fitted to sustain the frame-work in an erect posture, yet so numerous and varied in their order and arrangement as to admit of every desirable kind and extent of motion; and finally we perceive it giving points of support to the

ribs which protect the organs of circulation and respiration, and a firm attachment and support to the great channels of circulation and to many of the viscera of the abdomen. Amid such a multiplicity and variety of properties and functions, many of them essential to life, can it be thought strange that disorders and diseases are numerous?

The spinal column is composed of 24 separate bones called vertebræ; and as each vertebra increases somewhat in size from above downward, they collectively exhibit a pyramidal figure, with its base resting on a large bone, the sacrum; and as this bone narrows toward a point, and is terminated by a smaller one, the os coccygis, they are called the lesser or inverted pyramid. Of the 24 vertebræ, 7 belong to the neck, 12 to the back, and 5 to the loins. Viewed laterally, the column presents three curves; the cervical portion is slightly concave posteriorly, the dorsal largely concave anteriorly, to allow room for the thoracic viscera, and the lumbar concave posteriorly, to give support to the liver and other large organs of the abdomen. A line drawn perpendicularly from the apex of the pyramid, or the atlas, to the centre of its base, would, if viewed laterally, exhibit a preponderating portion in front of it; and the weight of the head superimposed, and of the thoracic and abdominal viscera in front, increases the natural tendency of the column to bend forwards, which tendency is, however, resisted by the muscles extending along the spine from the sacrum to the head.

Each vertebra consists of body and processes. The bodies are interiorly of a light cancellated structure, increasingly so from above downwards; but their surfaces are hard and compact, as is nearly the whole substance of the processes.

Between the surfaces of the vertebræ is interposed an elastic fibro-cartilaginous substance, somewhat resembling gum-elastic, which acts like a cushion, yielding to pressure in all directions. The bodies of the vertebræ are held together by strong longitudinal fibrous bands in front, by connecting ligaments between the processes, and by deep-seated muscles.

The whole column is maintained in an erect posture by large superficial muscles, which ascend from the pelvis to be inserted like the stays of a ship from her hull to her masts. They are the latissimus dorsi, the longissimus dorsi, and the sacro-lumbalis. These powerful muscles fill the space between the sacrum and the ribs; and the two latter are so intimately blended and incorporated together as to

have the appearance of one large muscle, covered by and adhering to a strong, thick aponeurosis, of a white and glistening appearance, having in itself scarcely any trace of elasticity.

But there are other muscles connected with the spine, and influencing its rectitude, which neither arise from the pelvis, nor are comparable in their office with the stays of a ship. They arise from the occipital bone, and from the cervical and upper dorsal vertebræ, and are inserted into the shoulder and ribs; and may be compared to the lifts of a ship's yard, or the chains of a suspension bridge. In either case, the mast, or the prop to the chain, sustains the appended weight in equipoise. But when a defect or weakness occurs in one side of the mast or prop, or spine, or when undue weight is appended to one of the suspending cords, or when the cords are of unequal strength, or one of them stretches in its length, then the mast, prop or spine must bend and exhibit the appearance of a lateral curvature. The muscles thus situated in reference to the spine, are the trapezius, rhomboidei and levator scapulæ.

From this brief survey of the structure and functions of the spinal column and its appendages, let us turn to their pathological states.

And, *firstly*. When the spinal column has been held, for a short time only, in a laterally inclined posture, the inter-vertebral substance which had yielded to this state, will, on the resumption of an erect posture, recover its former equal thickness. But if the posture be long continued, the ligaments and muscles accommodate themselves to this state, and becoming permanently fixed, oppose the natural resiliency of the inter-vertebral substance which tends to restore an erect posture; and the lateral inclination thus formed, will in process of time affect in a corresponding manner the relative thickness of the two sides of the vertebræ, and thus produce a still more permanent distortion. The consequence of all this is, a change in the centre of gravity, for a line now drawn from the vertex of the head to a line between the feet will exhibit unequal volume of the trunk on its two sides. To correct this, there is a constant effort of the muscles to restore the equilibrium by bending the spine, in some other part of its length, in an opposite direction. Hence after a time another curve is formed, which may be termed secondary, or compensatory, having the same pathological character as the first. And this secondary curvature may and often does exceed the limit necessary to balance the first, and require to be compensated in its turn by a third curvature, thus giving to the column a serpentine aspect.

Secondly, when a small number of the bodies of contiguous vertebræ are softened or destroyed, by ulceration or necrosis, originating in constitutional or local cause, the spine can no longer be sustained by the ligaments and muscular stays, but bends forward at the diseased part under the weight of the head and other superincumbent portions, and produces an angular projection backwards, commonly called *hump* or *hunch-back*. Sometimes, in consequence of the diseased vertebræ being more wasted on one side than the other, the projection may present a twisted appearance. This disease often originates in tubercles formed in the cancellated structure of the vertebræ and the intervertebral substance.

Thirdly, when several of the bodies of the vertebræ are softened, or when, from weakness of the muscles that stay the back, the anterior or antagonizing muscles in front of the abdomen act with undue power, a more extensive and gentle bend of the spine is produced, called *posterior* curvature.

Fourthly, in posterior projection, as in lateral curvature, the centre of gravity is changed, which nature strives to correct by bending another portion of the spine forwards, producing *anterior* curvature. I am not aware that any author has spoken of anterior curvature as compensatory to a posterior projection, but I have seen cases that suggested the idea, and Dr. Abbie, the orthopedist of Roxbury, informs me that he has seen proof of the fact. Anterior curvature arises also from the same constitutional causes as posterior projection, as from rickets or from *mollities ossium* affecting the processes instead of the bodies of the vertebræ. It is also caused in the loins by the early shortening of one limb. This form of curvature may embarrass the viscera by projecting into the great cavities more than other kinds of distortion; but fortunately it is of rare occurrence.

Fifthly, the vertebral column may be shortened, without any material deviation. This may be produced by rickets and by *mollities ossium*. The two diseases are by some writers confounded with each other. But rickets, it should be remembered, is a disease of childhood alone, and is preceded by other marks of the disease, as curvature of the legs; while *mollities ossium* occurs in mature age, and is referable to some pre-existing constitutional disease, as syphilis, cancer, &c. This abnormal state may be called *shortening of the spine*. As it causes an eversion of the lower ribs, it gives rise to an appearance common also to angular projection, which is called chicken-breasted.

Sixthly, abscesses may form between the lumbar vertebræ and

psoas muscle, and point in various depending places. They may erode and destroy the bodies of the vertebræ by ulceration, and sometimes the disease, owing to a jar or shock of the loins, may begin in the vertebræ themselves.

Seventhly, injuries of the spine, as fracture of the bodies or processes of vertebræ, with or without dislocation.

Eighthly, a defect may exist in the bony cylinder enclosing the spinal marrow, caused perhaps by an undue quantity of serum surrounding the spinal cord, and pressing its membranes outward at some point in the form of a sac. This constitutes *spina bifida*.

Ninthly, there may, from some morbid cause, general or local, be an undue deposition of osseous matter on the surface, forming a large tumor called *exostosis*.

Tenthly, the spinal cord or its membranes may be diseased structurally or functionally.

LATERAL CURVATURE OF THE SPINE.

The foregoing pathological remarks prepare the way for an investigation of the nature and the best mode of treatment of the several diseases we have mentioned, as appertaining to the spinal column and its appendages. Considering them in the above order of arrangement, we shall proceed to describe the one which is of most frequent occurrence, lateral curvature of the spine.

The following table, made out by Mr. Ward, an eminent English surgeon, will show the comparative frequency of the various spinal diseases as presented to him during a long career of professional experience. Of 282 cases, there were,

Of curvature to the right side without disease,	230
Of " " left side " "	10
Of posterior curvature without disease,	9
Of " " with " "	30
Of anterior curvature,	3
	<hr/> 282

These occurred in private practice, and, so far as I am able to judge from experience and inquiry, they present a fair sample of the average proportion in other large cities among the higher classes of society; but in other communities, the proportions, as we shall have occasion to remark, would be somewhat varied.

The causes of lateral curvature may be considered under the heads

of proximate and remote. The bones themselves, it has been well ascertained, and the foregoing table confirms the fact, are not primarily diseased. Formerly, ulceration of them and the formation of matter were apprehended as among the sequelæ, to prevent which, as well as to promote the absorption of matter, many surgeons were in the habit of torturing their patients with issues, setons, moxas and hot irons. Their efficacy in posterior angular distortion, *maladie du Pott*, which, as dissections have proved, is essentially different in its nature, partly gave rise to this most pernicious error as to the proximate cause. Another origin of the mistake has been the reports of cases of lateral curvature which represent the bones after death as softened and full of scrofulous matter. This opinion, Mr. Shaw thinks, will on close investigation be found incorrect; "for in the greater number of instances the internal structure of the bodies of the vertebræ has a natural appearance. It is easy to account for the mistake. If the vertebræ of a patient who has long been confined to bed, be examined, the appearance described above will be found; but if the person has been in the habit of taking exercise a short time previous to death, the bodies of the vertebræ are discovered to be as firm and compact as those in a perfect spine. It is well known that the shape of the vertebræ is materially altered in cases where the spine is much distorted, but as no mark of disease is discovered when a section of the bones so misshapen is made, we may infer that the change of form is independent of any specific disease, and also from the fact that it is found to correspond to the direction in which the pressure of the distortion has been made." In fact, it is almost certain that the vertebræ, in cases of lateral curvature, are even less liable than more solid bones to be inflamed by the irritation caused by pressure; and the opinion formerly prevailing, that actual disease of the bone does exist in such curvatures, is without foundation;—an effect has been mistaken for a cause.

Of the cartilages it may be said that their soft and yielding nature tends to produce lateral curvature; and as this softness decreases by age, the tendency to the disease diminishes, rarely appearing after middle age. Mr. Pott says he has never known it occur after the age of forty. To the greater firmness of the cartilages in laboring people, M. Wasse attributes their exemption, as compared with the sedentary; they sink less in height during the day. A yielding state of this substance seems therefore a necessary condition; but this is by no means a proximate cause. In respect to the ligaments of the vertebræ, a relaxed state of them may accompany curvature, but as

they are passive in their nature, this relaxation must result from the influence of some other cause.

The next texture to be considered, and one which plays an all-important part, is the muscular. It is here that the trouble begins, and here it continues. Commencing insidiously, and in parts deeply seated, the change from their normal state passes on unobserved until a more palpable one is discovered in distortion of the spine itself, and of the whole contour of the trunk. The spinal column, as before remarked, depends for its rectitude on the muscles or stays that hold it in equilibrium, which it loses whenever the muscles of one side act with a force different from those of the other side. It is not the positive but the relative force that is to be considered; for the muscles of both sides may be and generally are weaker than those belonging to a healthy spine, yet a slight difference in the force of traction between the two sides results in the formation of a curve, into the convex side of which the muscles, acting with undue force, will be found inserted. The same effect is also produced, when both muscles are of equal strength, but those of one side are more acted on than those of the other; as when the pelvis is depressed on one side by lameness of the hip, knee, or ankle, or by a shortness of one limb, in which nature accommodates herself by bending the spine, so that the patient can bring the foot to the ground; or when the muscles leading from the back to the right shoulder act, by using the right arm exclusively.

I may here briefly advert to the opinions of the two most distinguished writers on spinal curvature in respect to two other causes of the disease. M. Guérin, who undoubtedly stands at the head of orthopedic surgery in France, in his treatise on the etiology of lateral curvature, maintains that a great number of cases are founded in a morbid retraction of one or more muscles, or a part only of a large muscle of one side, caused by some fault in the brain or spinal marrow; and he goes into a long process of reasoning to establish his position.*

I have thus, in duty to the reader who expects to have the new doctrines, emanating from high sources, posted up to the present time, barely alluded to Guérin's etiology of spinal distortions, published in 1841. He, however, does not refer all cases to this cause;

* His first point is, that manifest deformity of the nervous centres in new-born children, is commonly attended with spinal deviations; secondly, where no such abnormal alteration in the nervous centres manifestly exists, he has discovered it in some autopsies. But as such verifi-

knowing, as he must, that in a majority of them, more satisfactory ones could be assigned.

The other doctrine is that of Dr. Stromeyer of Germany, who with Mr. Dieffenbach holds there, the rank that M. Guérin does in Paris. He maintains that lateral curvature is produced by palsy of the serratus major anticus of one side, which he attempts to prove by numerous experiments. But as the practical inferences from this system are unimportant, they may be dismissed with the remark, that while adequate causes are assignable—and such in most cases do actually appear—there can be no occasion for searching after others, which if they are proved to have any effect, have very little to do in the indications of treatment.

The *remote causes* are numerous, but the principal one is muscular debility, general or local. Hence the disease is confined mostly to early years, before the muscular frame is fully developed, and occurs rarely after the age of 24, commonly before 18. It is peculiar to females, in whom it occurs a hundred times when it once affects the other sex. (*Shaw.*) It is confined chiefly to persons in easy circumstances; in fifty cases there will not be found more than one in indigent life. It affects mostly those who compress the muscles of the spine by stays, and thus prevent their due development of volume and strength; also those who use one arm exclusively in their daily avocations; and those who live secluded and inactive lives.

It would be impossible to find a class of persons in whom all these circumstances are so fully combined as in young ladies at boarding-schools, and it is in these, of all places, that the greatest number of cases are manifested. "It appears, from actual computation," says Prof. Caldwell, "that of the females who have been accustomed from early life to tight corseting, nearly one-fourth have some unnatural or disfiguring flexure of the spine. A Scotch gentleman of distinction assures us that he has examined about 200 young females in fashionable boarding-schools, and scarcely one of them was free from corset injury. Those whose spines were not distorted, had unsightly effects produced on their shoulder-blades, collar-bones, or

cations are not often practicable, he endeavors to establish the point by analogy and inferences: 1st, from the fact that such spinal distortions are often co-existent with other diseases, as club-foot, wry neck, and permanent contractions of the joints, indicating a common nervous cause, and with diseases known to originate thus, as paralysis, epilepsy, &c. 2dly, he cites many cases of spinal curvature following cerebral and cerebro-spinal affections, and concludes that though there co-exist only some very slight affection, as squinting, or even none at all (for the spinal nerves may be the only ones affected), yet the effect may be a loss of equilibrium in the spinal muscles, and consequent deformity.

some other part of the chest, which stuffing or wadding would be required to conceal. Some were hunch-backed, and in not a few, one shoulder was higher than the other, effects which in our own country are much more frequent than is generally suspected." What do we actually find in these schools? There is feeble respiration, and consequently spare oxydization of the blood; inaction, and consequent debility, of the muscles, besides which, those of the spine are compressed and weakened by corsets; inclination of the body to one side whilst using the arm in drawing, writing, &c., and consequent enlargement or elevation of the right shoulder, which becoming stronger by use, gradually frees itself from the compression till it draws the spine into a curve. There is also a tendency to curvature in another part of the spine from the same causes; the constant efforts made to support the spine erect, with weakened muscles, induces a sense of fatigue, which the pupil seeks to relieve by inclining the body to one side whenever she finds the eyes of the instructor turned away from her.

The neglect of exercise and seclusion from fresh air in our schools, calls loudly for reprobation. The young of all classes of animals are prone to exercise, and by it acquire muscular development and energy. The wild savage, who ranges his native forest, free from the tyranny of custom, exhibits a spine straight as the winged arrow that flies from his sinewy grasp. "The attempt to alter the natural figure of the body by tight stays and tight lacing, the want of proper and daily exercise, by which the health is preserved, and the body enabled to carry on its functions, cannot be too strongly condemned."

Although confined mostly to the rich, there are cases of this disease among females of humble condition, whose occupation is sedentary, such as lace-makers, dress-makers, tailoresses, and the like; also persons carrying heavy burdens in one hand or on one arm or shoulder, as a young mother, or nurse carrying a child. An interesting case is given by Mr. Child, within the last year, where an aged aunt rested much of her time upon the left shoulder of her niece, and the effort of her muscles in sustaining her weight caused a curvature to the left side. Nor are young mechanic apprentices free from it. In such as are employed in printing and press work, where strong and repeated exertions of the right arm are required, the spine is apt to become twisted.

I should do injustice to the subject, were I not to mention among the causes of lateral curvature, depression of spirits. In reflecting

on a large number of cases that have come under my care and observation, a majority of them seem to be either caused or aggravated by deep affliction or disappointed affection. Some recovered from the acuteness of their grief with manifest improvement in the strength of the dorsal muscles, but relapsed immediately on the occurrence of new afflictions.

Curvature of the spine, like other malformations, as club-foot, fissure of the palate, hare-lip, &c., may be congenital. Such cases are too often neglected, and considered as helpless. The remedies usually employed for the disease in after years, may, if judiciously varied to suit the tender frame, give relief, if not effect a cure. They should be used as soon as the strength will bear, and before the bones become formed.

Spinal deviation may arise from debility coming on after the infantile complaints, such as small-pox, scarlet-fever, measles, whooping-cough, have too rapidly succeeded each other; and it may assume various forms, though most generally the lateral. In such cases attention should immediately be given to the state of the constitution, to fortify it as soon as possible by any means that may suggest themselves, and some slight support may for a time be necessary to arrest the progress of the distortion.

Symptoms.—Patients complain of pains in the pit of the stomach, in the side or in the abdomen, most frequently, however, in the back or chest, with general lassitude, and sometimes numbness of the limbs. But often no complaint is heard till the curvature is discovered by others. The child, from 9 to 16 years old, frequently attempts to prevent the dress from falling off one shoulder; or one shoulder appears higher or larger than the other; or one of the collar-bones, or one side of the breast-bone or the breast itself, appears fuller than the other. A swelling, as the parent supposes, is discovered at the ends of the false ribs of one side, as if a tumor were growing within; a thickness or fulness of one side, and a sinking in of the other; one hip appears to project, or, as the mother expresses herself, is “growing out;” one leg appears shorter, and the patient is in the habit of standing on one limb with a hand behind the back holding the opposite elbow; a peculiar manner of walking, one foot being swung round, and the shoulder thrown forward. I have in several instances known parents, and even young physicians, to mistake a curvature between the shoulders for a tumor under the shoulder-blade, and curvature in the loins for hip-disease.

The diagnosis of lateral curvature is easily understood. A plumb-line falling from the centre of the neck in the median line, will show the slightest deviation. The most important point to determine is the cause; whether it be diseased vertebræ, for this does no doubt exist in some rare cases, or whether it be a shortening or lameness of one limb, a weakness in the spinal muscles, or mollities ossium or rickets.

I have already adverted to the fact that where one curvature exists some length of time and destroys the equilibrium, there is an effort of nature to restore the central line of gravity, by producing a second, or compensating curve. M. Guérin remarks that an actual pathological curvature is never single. "I have," says he, "collected and described before the Academy, all the morbid specimens now in the capital, and cited all the cases of the living that I ever knew, all which show two, three, and sometimes four curvatures alternating, almost always three, very rarely two, and never one."

Authors differ in opinion respecting the primary seat of lateral curvature. Mr. Shaw contends that it always commences in the loins, the dorsal curve being secondary; and a majority of writers concur with him. Mr. Child and Mr. Coulson contend that the upper curve is first formed. When this discrepancy first arrested my attention, I was inclined, judging from the cases I had witnessed, to concur with Mr. Child. Since then, however, I have examined several other new cases, and found them all existing in the loins. They were, however, young subjects, short of eight years old, and not yet exposed to the influence of those causes that are known to be most productive of distortion, viz., corsets and undue exercise of one arm. On the other hand, press-men, who cause the disease by pulling violently with one arm, must certainly exert the tractile force high in the back by means of the trapezius and rhomboidei muscles; and females of boarding-schools exercise chiefly one arm, all which certainly favors the idea that, in such cases at least, the dorsal vertebræ are acted on by these muscles, and are drawn into a curve. It is probable, therefore, that the curvature may begin in either the back or in the loins.

When the curvature appears in one of these places, a compensatory one follows in the other place, giving to the spine the appearance of the letter *S*; and when a large lateral curvature occurs in the middle of the spine, there will be two smaller compensatory curves, one above and the other below, which will give to the spine the appearance of the Greek letter ζ Zeta.

Prognosis.—This requires caution. If the distortion come on between 8 and 14, and after one of the exanthems, as measles or scarlet fever, it may be considered as curable. If placed under early treatment, and especially when it is attributable to a known cause, as constrained posture or seclusion, which can be obviated; if the curve be in a gentle waving line, and not acute, and its convexity, if between the shoulders, is to the right side; if no constitutional cause preceded it; if little severe pain is felt; if no other disease or distortion exist that tends to keep it up; if no ankylosis has formed; all of which points are easily ascertained, there is every reason to hope for a cure. On the contrary, if the disease commenced in early years, and has existed for more than a year or two; if the patient exhibits symptoms of a diseased lung; if individual ribs are bent or twisted or ossified together; if the spine is ankylosed; if the limbs are of unequal length or dislocated; if there are strongly marked symptoms of scrofula or rickets; if the curve be abrupt; if it originated in an injury; if the convexity be toward the left shoulder, there is less if any prospect of a cure.

Treatment of Lateral Curvature of the Spine.—Perhaps no disease has been treated so variously, I might say oppositely, as lateral curvature of the spine. One surgeon confines his patient rigorously to the same position for months; another requires certain violent exercise for years; a third rubs and shampoos; a fourth invests his patient with artificial collars, stays, &c.; a fifth attempts to replace bones alleged to be dislocated; a sixth stretches his patient on an inclined plane; a seventh pulls at head and feet, or at axilla and pelvis, with pullies and sliding mattresses; an eighth lays them on a rolling bed; a ninth opposes the curves by what he calls sigmoid flexion and extension; a tenth leeches and blisters, or applies caustic and moxa, and many advise nothing at all. Each surgeon adheres pertinaciously to his favorite plan, and adduces so much testimony in its favor that we are bound to believe they have to a certain degree all been successful. We can account for this only by supposing that there is a variety in the causes, or else that practitioners have severally deceived themselves by attaching importance to success in one or two instances, and forgetting that there are so many distinct stages in the progress of a common case, that every mode may at times be applicable. Every newly invented instrument or remedy becomes the hobby of its inventor, who, having found it suc-

ceed in two or three cases whose peculiar nature had suggested it to his mind, forthwith proclaims its virtues to the public, as adapted to nearly all cases, and, ten chances to one, writes a smart octavo embellished with plates.*

To return from this digression ; What is the best mode of treating lateral curvature of the spine ? In answering this, it will be necessary to consider it in its different stages and aspects. In the first stage, there is more or less general debility, and we will suppose a slight curvature ; the right shoulder, it may be, is slightly elevated, and the left hip slightly projecting. There is found a deviation of the spine from a plumb-line of perhaps one, two, or three inches, and in most cases an elevation or projection of the right scapula. When called to such a patient, the physician should at once obviate any known or suspected cause as far as possible ; if at school, advise immediate removal, prohibit employments that require a sitting posture, or the more frequent use of the right arm than of the left, recommend exercise in the open air, and when fatigued a recumbent posture, instead of sitting ; the back to be rubbed and shampooed or manipulated, shower-bath, and, if the season admit, sea-bathing. The exercise in the open air may be walking, games of sport, swinging, and various other gymnastic and calisthenic exercises, care being taken to use both feet alike, whether in standing or in moving about, and to preserve the standing posture no longer than is agreeable, and instead of resting the back in a sitting posture, to lie down.

* The multiplicity of these books published in England alone, within the last ten years, is truly astonishing. In the short space of the two last years, not less than a dozen separate works have appeared, having nothing to recommend them over books already in the market, but some contrivance, or some alteration of a former one, for stretching and sustaining the body, all of which might have been published in two or three pages of some medical journal. Our own country, so far from being surfeited with such books, has not yet produced a single volume, or even a reprint of one, upon spinal distortion ; and it is to be hoped that the subject will be delayed still longer, in order that the vast number of machines and remedies now in use in Europe and this country may be fairly tested, and their respective merits and adaptation to each variety of case well ascertained. This is in a fair way of being done in the Orthopedic establishments already in operation. Dr. Abbie opened the first one in Worcester, which he has removed to Dorchester, where ample and commodious arrangements are provided at one of the most beautiful country-seats that can be found. Dr. Brown, of Boston, has opened another in an elevated and healthful situation near the State-house. He has procured the newly invented apparatus of Paris and London, among which is Guerin's bed for sigmoid extension and flexion, so highly recommended for correcting lateral curvature, and he has provided the best means for exercising his patients that European establishments afford. Besides these gentlemen, several distinguished individuals of New York, Philadelphia, and other cities, are giving the subject the attention it deserves. Among them I may mention Drs. Mott, Kissam, and Brewster, and Drs. Mitchell and Chase. Dr. Kissam invented the chair, and Dr. Mitchell the standing supporter, hereafter represented by plates, and Dr. Chase has connected this with his other branches of orthopedic surgery. Dr. Mott is known everywhere, and Dr. Brewster bids fair to become so by his zeal and faithfulness in this department of surgery.

Shampooing, or manipulation, consists in squeezing or pressing the muscles in the hand, and between the fingers, and kneading them with the clenched hand. The various modes of exciting the warmth of the part, and promoting a greater flow of blood to it, vary in their effects only in degree, and are to be carefully adapted in kind and extent to the circumstances of each case; but generally they are to be continued not less than an hour, and repeated twice or thrice during the day, or as often as the patient can bear. The faithful application of this remedy, in conjunction with warm fomentations, which regular practitioners have neither time nor inclination to apply, has given great celebrity to a few individuals, called natural bone-setters. It would be well in large communities to have a few persons in the capacity of nurses initiated in the practice of shampooing or manipulating, as is the case in Edinburgh.

To the foregoing mechanical means should be added cold sea-bathing during the summer, and frictions with salt and brandy at other seasons. Internally should be exhibited ferruginous preparations in such form as can be best endured, and other mineral tonics, with such mild vegetable tonics as the patient can bear.

In the second stage, when the deviation is more considerable, and the ligaments, inter-vertebral substances, and muscles, are supposed to be materially changed from their normal state, and especially if it be rapidly increasing, the good effects of exercise in an erect posture are not so certain, and the distortion is more likely to resist all the common remedies above mentioned. The head and shoulders weigh upon it with more effect in proportion to the increase of curvature, and require to be sustained by artificial support, to prevent the exercise from proving injurious. The instruments contrived for this purpose are numerous, but they consist of such supports as are adapted to rest on a leather or metallic cincture reposing on the bones of the pelvis, and press upward against the axilla, like crutches, or a shaft may extend, from the cincture resting on the hips, along the spine and above the head, and by means of straps under the occiput and the chin, united on the vertex of the head, and made fast to the spinal shaft, effectually take off the weight of the head and shoulders from the curve during exercise. Drs. Mitchell, Kissam and Abbie have each invented, or have improved, instruments having this object in view. They are so contrived as to admit of both a turning and a nodding motion, and to allow free exercise, and are intended to be laid aside when the patient lies down. Such modes

of support are preferable to splints with girths round the body, which compress the dorsal muscles.

The dorsal muscles may be exercised by having a strap under the chin, and passed over the vertex, and there fastened to one passing in like manner from the occiput, the two being made fast to a cord extending over a pulley in the ceiling, having a weight at the other end. The patient may, in a sitting posture, a few feet distant from the pulley and facing it, draw the head backward and allow the weight to pull it forward again, and by thus repeating this nodding motion may exercise and strengthen the dorsal muscles, while at the same time he is straightening the spine. Swinging by the arms, or by the head and arms, and lying on an inclined plane, with suspending bandages under the arm-pits, are worthy of a trial; and in bad cases Mitchell's supporter, or Kissam's chair, or Guérin's bed, may be resorted to, with certain encouragement of benefit. All the local remedies and manipulations recommended in the first stage, as well as internal remedies, should be most thoroughly tried.

If the distortion depend on a contraction of the dorsal muscles that resists its return to a straight line, it may be necessary to divide them, as hereafter described in Guérin's plan, but this should rarely be done.

In the third stage we may suppose the bony structure much changed. The curve having increased and existed a long time, the bodies of the affected vertebræ become wedge-shaped, from side to side, the ribs and sternum are distorted, and the hip of the opposite side projected. I would here recommend that the patient be carried to an orthopedic establishment, as the most sure, if not the only way for a recovery. Parents and nurses in private dwellings will neglect to follow out the necessary plan of treatment, in all its details, and the physician himself will hardly be able to select and rightly time the various remedies that the case may require. All the means advised in the second stage must be rigidly persevered in, with the addition of other contrivances for compressing and restoring the spine and ribs to their normal state, by parallel extension with lateral pressure, or by Guérin's bed for sigmoid flexion and extension.

The means for parallel or lengthwise extension are applied by belts placed round the pelvis, and round the upper part of the trunk in the axillæ, to which ropes are attached that pass over the head and foot of the bed, and have weights appended there. Another cord may in like manner extend from the head to a pulley and weight. The rolling-bed of Shaw is made with a surface of elevations and de-

pressions, adapted to meet and correct distortions. Also, there is a bed consisting of two cushions to which the patient is fastened, and which are drawn by weights and pulleys attached to them at the head and feet, the patient's curvature being at the place where the cushions are drawn asunder, and a bed constructed with an inclined plane is sometimes used. These and various other contrivances for extension and lateral pressure have been invented, and might be described if time and space permitted; but I think they all fall short in their efficacy of Mitchell's moveable supporter, Kissam's chair, and Guérin's bed for sigmoid flexion and extension, each of which I shall now describe.

Dr. Mitchell's moving supporter, represented in the plate, is very serviceable, as it enables the patient whilst suspending the head and shoulders and straightening the spine, to take exercise by walking about the room. I witnessed the decided improvement that attended its application in a comparatively very short space of time. A useful improvement would, however, be a spiral spring extending from the vertex of the head to the crane above. This would break the shock which might otherwise be given to the neck by taking a false step when suspended by the head.

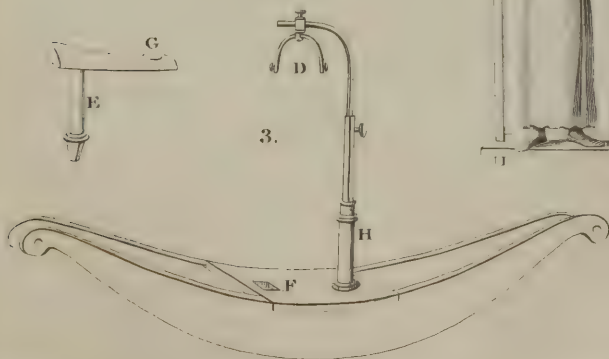
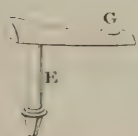
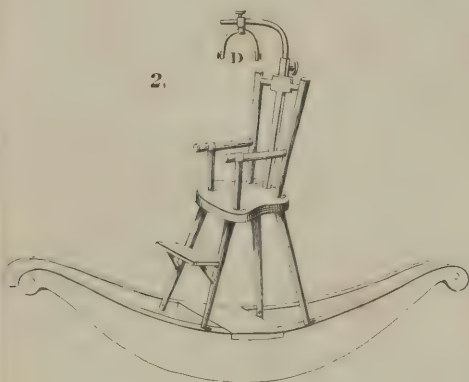
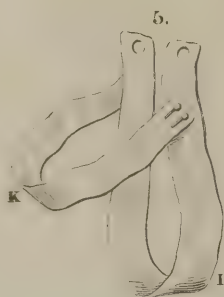
Fig. 1. A, a crane inserted in a socket, having a thumb screw, B, to fasten it when raised or lowered to suit the height of the patient. This socket is made fast to the encircling wood, C, which opens with a hinge for its entrance, and is supported by four legs with large castors to move about on. D is an iron supporter suspended by a swivel to the crane, and to which the head-pieces I and K, made of soft leather, are attached.

Fig. 2 represents a rocking chair with like contrivance about the head.

Fig. 3 represents a rocking horse, E and G being inserted at F to ride upon.

Fig. 4 represents a swing, L being a roller.

Dr. R. S. Kissam, of New York, has invented an apparatus for correcting lateral curvature, which possesses great merit. It is a chair which combines the essential properties of *extension* of the spine, *contra-flexion* of its curves, and of *pressure* upon the abnormal projections of the ribs and scapula, at the same time it permits the patient to enjoy a sitting posture so as to read and sew. An important accompaniment to this would be a bedstead and mattress, representing an inclined plane, on which the patient might sleep, hav-



ing a pulley extending from a belt under the armpits over the head of the bed through a pulley to an appended weight—the gravitation of the lower part of the frame during the night would keep up a constant slight extension upon the curve.

Kissam's Chair.

Explanation of the Cut.—*a a.* At the back of the chair are tubes containing spiral springs, the power of which are increased at pleasure by screws at the bottoms of the tubes.

d. Continuation of the back of the chair fitting into *a a*.

c. Arms for embracing the ribs, to support the body—resting on and attached to *d*. When *c* is adjusted by means of a strap, and the patient sits down, the weight of the body is thrown upon the springs contained in *a*, and the spine is constantly extended by their action.

b. Braces on which the arms are fastened, are so contrived, revolving on *d*, as to exert any desirable amount of pressure on the angular ribs of the convex side of the patient.

The junction of *d d* with the crosspiece at the top, are so made as to allow of motion; either side may be elevated or depressed, to assist in contra-flexure.

g g. Two springs fitted in the seat, adjustable to a given height.

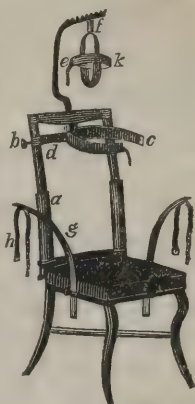
h h. Straps to encircle the body, and attached to *g g*, the upright springs.

The springs *g g* produce contra-flexure, by acting on the convex sides of the curves of the spine.

e. A crane to which is attached *k*, the head piece, which is placed under the chin and buckled around the head; thus any force applied in extension acts equally on the occiput and chin.

f. A tube containing a spiral spring, which constantly extends the spine from the shoulders.

When seated in this chair the patient is at perfect ease; the spine is extended, and is bent in a contrary direction to the diseased condition. No organ is in the least disturbed in its action, and the circulation especially is not obstructed. The patient is at liberty to converse, read, sew, or amuse herself in any way not incompatible with a sitting posture.—*Lancet*.



An important addition to the chair of Dr. Kissam, would be large

castors or swinging wheels under each post—which would enable the patient, with the aid of a staff, to roll about the room. Or the chair bottom might rest on the axle of two wheels of two or three feet diameter, and having a third small one behind the chair to support and steady it. The patient might roll such a chair about in any direction by turning the two wheels with the hands applied to their rims. Such chairs are commonly used by patients affected with palsy, but have not, to my knowledge, ever been connected with a suspensory apparatus like Kissam's chair.

Guérin's Bed for Sigmoid Flexion and Extension.

The author commences his description of this by remarks on the various European machines that had preceded, and admits that they did good to some extent. He then enters on a mathematical calculation of the force of traction necessary to reduce a curve when applied at the head and heels, and at the two extremities of the spine by fixing the head and shoulders and drawing as directed in using several beds. He concludes that 83 per cent. of the tractile force is expended in stretching the vertebræ one from the other by overcoming the resisting ligaments, muscles and fibro-cartilages which unite them, and that the effect of a given force of extension in diminishing the curve lessens continually, till it finally becomes inoperative before the spine is straightened, and that hence arises the difficulty complained of by many authors of removing the last degrees of spinal curvature. The ill effects of such strong extension are weakness of the bonds of union of the vertebræ, and a tendency to relapse into a still greater deformity. Besides which, the great efforts made to remove the last degrees of deformity have also the tendency to efface the *natural* curvatures of the column as presented in profile, which are necessary to the firmness of standing, and to the graceful figure which should mark the female form.

He begins his description by comparing the curved spine to a staff with a bend in it, and proposes to straighten it on the same principle, not by pulling lengthwise at each end as is usually done with a curved spine, but as he would straighten the staff by seizing fast the two ends with the hands and pulling the convexity of the curve against the bent knee, so would he fasten the spine in a straight horizontal position, and bend the trunk in a direction opposite the curve by fixing a firm prop against the prominent convexity and bending the body against it by force applied above and below it. Furthermore, as he would in straightening the staff bend it beyond a straight line,

in order that its natural elasticity might not reproduce the curve, so in applying force above and below the spinal curvature he would cause it to produce one in an opposite direction, and thus render the spine perfectly straight, which those who trust to extension alone fail to do.

Guérin's apparatus consists of a couch divided into three portions, a small one resting under the curvature, another larger one to support the head and shoulders, and a third the hips and lower extremities. These are so connected together as to admit of being turned one upon the other. The body being laid straight upon this and confined in every part, the head and foot of the couch are turned from a straight line to a curve opposite to that of the patient's spine. This is done by a ratchet and other apparatus which it would be difficult to describe on paper, and which is rendered unnecessary by the fact that several of Guérin's beds are in use in the orthopedic establishment of Dr. Brown of Boston, which may serve as models to make others by, and Dr. Mott of New York is supplied with them.

There is perhaps no contrivance for correcting curvature of the spine, whose value has been tested and promulgated under the authority of so imposing an array of names as Guérin's bed. Eight of the most distinguished surgeons of the Royal Academy of Medicine examined its construction and watched its effects on ten patients who were subjected to its trial, who reported as follows.

The first patient was aged 6 years, affected about two years ago with lateral deviation of the spine, with curvature of lower limbs, and lateral flattening of the chest; had followed no treatment. Fourteenth of January, 1836, she presented the following condition. A lateral dorsal deviation to the right, 7 inches of flexure, 3 curves. The upper curve, to the left, occupying the cervical and first dorsal, had 3 lines of flexure; the middle, to the right, in the middle dorsal, 5 lines; the lower, to the left, in the last dorsal and the lumbar, 6 lines. Height 36 inches 2 lines; general health poor, general rickets.

After 14 months' treatment, the spine was to all appearance straight; there were, however, some traces of torsion of the vertebræ; the subject had grown 2 inches 7 lines; general health excellent.

Second patient was aged 8 years, affected about 18 months with right lateral deviation, had had no treatment. At first she presented a lateral deviation in the middle dorsal, to the right, with one inch of flexure, with 3 curvatures, the upper and lower almost insensible in the direction of the spinous processes. Height 40 inches 10 lines; health weak.

Fourteen months after, the deviation was reduced to about one line; height increased 2 inches 3 lines; health excellent.

Third patient was aged 8 and a half years, had a lateral dorsal deviation to the left, with rickety curvatures of the limbs, and lateral flattening of the chest. The deformity was from birth, increased 6 years, then became stationary.

At first, presented a lateral deviation in the middle dorsal, to the left, 9 lines of flexure, with 4 curvatures and very considerable twisting of the column. First curvature occupied the last cervical and the first dorsal, flexure 2 lines; second, from 2d to 8th dorsal, flexure 7 lines; third, from 7th dorsal to 2d lumbar, flexure 2 lines; fourth, occupying the rest of the column, was insensible in the direction of the spinous processes. The surface of her back was very irregular, and the general appearance indicated a very old and deep deformity. Height 37 inches; general health bad.

Fourteen months after, the deviation had lessened one half; height increased one inch; health a good deal bettered.

Fourth patient, aged 9, had a lateral deviation of 4 or 5 years' standing, and ever since increasing.

At first, presented a lateral deviation to the right, in the upper dorsal, of 1 inch 3 lines, with 4 curvatures. The first and last were almost insensible in the direction of the spinous processes; the second, to the right, from the 2d to 7th dorsal, with 10 lines flexure; the 3d, 8th dorsal to 2d lumbar, 8 lines. Height 43 inches; health good; there was no other deformity.

Fourteen months after, the column was straight; there was little difference in the projection of the shoulders; height was increased 3 inches; general health very good.

Fifth patient, aged 12, had quite an inclination of the head to the left, with rotation to the right, and two curvatures, succeeding the deformity of the neck. This affection was developed as the sequel of scrofulous abscesses, of which the cicatrices had caused retraction of the skin, and left sterno-mastoid and platysma muscles; the deformity was considerable, and the left side of the head almost touched the summit of the shoulder. General health was very bad; there was many months ago an intense scrofulous ophthalmia.

Fourteen months after, the head was completely brought straight; the sides of the face being unsymmetrical still showed marks of deformity; but the axis of the head and neck was completely identified with that of the column; the supplementary curvatures of the spin had wholly disappeared; general health was excellent.

Sixth patient, aged 12, had 3 years since a lateral deviation in the lower dorsal to the left. At first, it had a flexure of 8 lines, and consisted of 3 curvatures. The first, to the right, occupied the first 7 dorsal; flexure 3 lines; the second, to the left, occupied the 5 last dorsal and the 2 first lumbar; flexure 7 lines; the third, occupying the last lumbar, was 3 lines; height 47 inches.

At the end, the spine was straight; the two sides of the back symmetrical, and height increased 3 inches 2 lines.

Seventh patient, aged 14, had since birth a lateral deviation of the dorsal and lumbar, to the right, accompanied with a club-foot.

At first, the deviation amounted to 12 lines, and had 3 curvatures; the first, to the left, occupied the first 6 dorsal; flexure 3 lines; the second, to the right, occupying the 6 last dorsal and 2 first lumbar; had 8 lines of flexure; the third, to the left, occupying the rest of the spine, had 4 lines of flexure.

At the end, no trace was left.

Eighth patient, aged 12 years, had had 15 months a lateral deviation following a long intestinal disease.

At first, a lateral deviation in the dorsal and lumbar, to the left, 9 inches flexure, 3 curvatures. The first, towards the left, in the last cervical and 2 first dorsal; flexure 3 lines; the 2d, to the right, from 3d to 9th dorsal; flexure 5 lines; the 3d, to the left, occupied the last dorsal and the lumbar; flexure 7 lines. Height 50 inches; health weak.

At the end, the column was wholly restored. For 8 months it has remained straight; health greatly strengthened; height increased 3 inches 5 lines.

Ninth patient, aged 14, lateral deviation, with lateral flattening of the chest, dating from 2 to 3 years, preceded in infancy by curvature of the limbs.

At first, a lateral deviation in the dorsal and lumbar, to the left, of an inch in flexure, with 3 curvatures. The 1st, to the right, comprising the 6 first dorsal; flexure 3 lines; 2d, to the left, 6 last dorsal, of 6 lines; the 3d, to the right, occupying the last lumbar, was appreciable only by the torsion. Height 49 inches 3 lines; health very weak.

At the end, no deformity remained; height gained, 4 inches one line; health grown better.

Tenth patient, aged 17, had a deviation of the 3d degree, with considerable projection, of 9 or 10 years' standing, following a violent blow on the back.

At first, a lateral deviation in the middle dorsal, to the right; flexure 19 lines; 3 curvatures. The 1st, to the left, in the last cervical and 3 first dorsal; flexure 5 lines; 2d, to the right, from fourth dorsal to first lumbar; flexure 15 lines; 3d, to the left, last 4 lumbar; flexure 10 lines. Height 58 inches; health good.

The first curve was wholly effaced; the second reduced to 10; third, to 5 lines; projection lessened; height increased 2 inches one line; general health excellent.

The Report summed up these cases as follows:

Five, complete cures; 2, nearly complete; 2, considerable improvement; 1, slight improvement. All this speaks favorably for Guérin's bed, but after much inquiry and experience, I am persuaded that equally favorable results would have followed the treatment by other mechanical contrivances, with appropriate constitutional and local treatment, used actively and perseveringly. The chair of Kissing, with some modifications, evidently combines the essential mechanical advantages of Guérin's bed. Neither of these, nor any other machines, are however alone sufficient to effect cures. Exercise, frictions, manipulations, tonic baths, the internal use of ferruginous preparations, and other tonics, are also essential remedies.

Operation for the Cure of Lateral Curvature of the Spine.

Within a few years, an operation has been proposed and performed with success, which will in some obstinate cases assist other remedies in effecting a cure that would else baffle every mode of treatment. It consists in dividing certain muscles with their fasciæ and tendons, which from their contracted condition perpetuate a curvature, in spite of all the ordinary means used to overcome it. There is some difference of opinion as to the originator of the operation, but it must be conceded that M. Guérin, of Paris, was the first to venture upon it boldly. He divides such muscles of the back and loins as appear in a state of tension, and sometimes extends his incision through the trapezius and rhomboidei along near their origin from the spine, and parallel with it, to the length of five or six inches, and at the loins through the common mass of the sacro-lumbalis and longissimus dorsi. "In all these operations," he remarks, "I have divided the muscular bundles, the aponeuroses, the tendinous sheaths, the vessels and nerves. In some cases there has formed a very considerable effusion immediately under the skin, and between the lips of the wound. I have," he adds, "closed the little orifice

at each dressing with a morsel of diachylon, and when the effusion has been considerable have made moderate pressure on the external swelling. All patients thus operated on, have by the third day been able to get up and walk, and to submit to mechanical pressure intended to correct the deviation of the spine, now released from the cords that held it."

He considers it as an established fact, that divisions of the muscles, cellular tissue, nerves, tendons, and vessels of small calibre, provided the incision be made under the skin, and air be carefully excluded, are exempted from inflammation, and that an immediate re-organization is effected somewhat after the manner of union by the first intention.

There are instruments invented specially for this operation, which bear some resemblance to a bistoury, but are much smaller and longer, the blade or cutting part being an inch or two long, and continuing in the form of a wire four or five inches, of the same width as the blade, to the handle. These instruments, after the model of those used by Guérin, are to be had in New York and Philadelphia.

Child's manner of operating.—"The plan I usually adopt, is to place the patient on my extension couch, or to raise her by means of pullies which I have fixed for this purpose. A cap should be provided, made with strong webbing. One band must pass in a circular manner round the head, and fasten beneath the occiput with a buckle, whilst another of the same material should encircle the sides of the head and face, the chin being received into a hollow made for that purpose. Where these bands meet on the vertex of the head, a strong loop must be attached, which, when extension is made, must be hooked into the cord which passes over the pulley, and in a very gentle manner the body is to be raised from off the ground. If by any of these means the spine is observed to move toward the mesial line of the back, the operation may be undertaken with every prospect of success; but if, on the other hand, the spine appears rigid, and betrays no symptom of mobility, we must be wary in raising hopes that can never be realized, by submitting the patient to a useless, although simple operation.

In the treatment of lateral curvature of the spine, under our present notice, there are three points to be considered: first, to release the spine from the power which retains it in its abnormal situation; second, to restore the vertebræ to the spinal line of the back; and

third, to prevent these bones from again relapsing into their unnatural situations.

The first of these is attained by a very simple operation, namely, by a division of the contracted muscles.

There are two modes of effecting this division. Thus, for that description of curvature which comes under the first division of our subject, in which the trapezius and rhomboid muscles have suffered from inordinate action, their division must be effected in the following manner:—

The patient being placed in a prone position, with the chest elevated and head hanging over a table, tension of the trapezius and rhomboid muscles must be made by drawing the affected shoulder upwards and outwards. A straight narrow bistoury of sufficient length is then to be introduced, at a point corresponding with the greatest convexity of the curve, and to be passed carefully upwards, with its flat surface between the skin and posterior surface of the muscles, and as close as possible to the spine, until it has reached to about the superior angle of the scapula; by a semi-turn of the handle, its cutting edge will then be brought in contact with the trapezius muscle; it is then to be withdrawn, care being taken that a complete section of the trapezius and rhomboid be made close to the spinous processes of the vertebræ. By observing this latter direction, we shall avoid much loss of blood. Having completed this section, the bistoury must be again introduced into the same opening, and carried downwards in a similar manner, withdrawing it as before, and taking care that every portion of these muscles be separated from their spinal attachment.

In the above operation there need be no apprehension of hæmorrhage, as the only artery of magnitude traversing these muscles is the posterior scapular, which, if proper precaution be used, need never be wounded.

For those which come under the second division of our subject" (lumbar curvature), "the operation is, if possible, still more simple. For these a transverse section of the lumbar muscles is to be made, and on the side corresponding with the convexity of the dorsal curve. The wound need not be more than a quarter of an inch in depth" (this must depend on the thickness of the cellular substance), "the most important point being to secure a complete division of the vertebral aponeurosis. The operation may be accomplished in less

than thirty seconds, with the most trifling loss of blood, and the patient, if possessing moderate courage, complains of but little pain, and is enabled to walk to bed.

The operation may be performed in the following manner. The patient being directed to bend forwards, a straight, narrow bistoury must be passed between the skin and vertebral aponeurosis. A retraction of the muscles immediately takes place, leaving a space of at least half an inch between the divided surfaces. A small piece of adhesive plaster must be placed over the wound, which need not be more than the eighth of an inch in extent, and a compress applied, well secured by means of a roller. The patient should then be placed on a hard mattress on the face, and kept in this position for three or four days. The wound will generally heal in less than a week, and no further inconvenience will be felt.

The operation will, of itself, remove the lumbar curve when present, without any further interference; but as far as the dorsal curve is concerned, although it will be considerably diminished, yet must only be regarded as one important step towards a permanent cure.

The patient being allowed to rest about a week subsequent to the operation, we must then have recourse to such means as will assist nature in repairing the distorted vertebræ.

The position in which the patient lies should be our first consideration. After the time above specified has elapsed, the prone position should be changed, and a folded pillow placed in apposition with the dorsal curve, and in such a manner that the patient lying on the side, with the upper and lower extremities bending over it, the intercostal muscles on the opposite side are kept upon the stretch, and the ribs separated from each other. The patient should then be induced to grasp with the left hand a rope suspended from the ceiling, and at such a height as to put the rhomboid and trapezius on the stretch, and at the same time endeavor to bring the arm to the side. By this latter movement, these muscles are thrown into a state of activity. This should be repeated frequently during the day."

He then recommends extension, preferring his own couch, which consists of a belt round the pelvis having a line attached running over the foot of the bed to weights which are appended, and at the head of the bed three pulleys, with lines leading to the head and shoulders, and made fast to a cap fixed under the chin, and to the straps under the arm-pits; weights are also appended to the other extremities of the lines. Pressure is to be applied to the convexity by the hand,

which is to follow each act of respiration, care being taken to handle the ribs gently ; and thirdly, friction along the back with some stimulating embrocations, and the judicious arrangement of well-regulated forms of exercise. The patient should not be permitted to sit up or walk about after the operation, without wearing some kind of support ; and if great care in this particular be not observed, much risk will be incurred of the spine relapsing into its former situation.

When a curvature exists for some time, one or two more will ensue, as a means of restoring and preserving the centre of gravity, and as before observed, are to be considered as compensatory. Now the effect of removing the first large one, whether it be in the back or in the loins, by the operation, will be to correct the others by the same tendencies that produced them, to wit, the efforts of the muscles to restore the equilibrium in the new condition of the spine.

I have purposely omitted to include in the foregoing cases ulcerations of the bones, as causes of lateral curvature, whether proceeding from local injuries or from constitutional causes. In these, ankylosis must be the aim of the surgeon, to procure which he will prescribe entire rest in a recumbent posture, stays in the form of splints, cuirasses and other artificial supports,—to allay inflammation, cupping and leeching,—and to arrest the ulcerative process by issues, setons, &c. In no other kinds of lateral curvature ought these counter-irritants ever to be used. Among the best are veratrine and iodine ointment. If the disease is founded in scrofula, the internal use of iodine ; if in syphilis, mercurials, alteratives, and diaphoretics, as decoction of the woods and syrup of sarsaparilla.

In all bad cases of lateral curvature, it is advisable, before commencing a regular and systematic course of treatment, to take a cast of the figure in plaster of Paris, and to repeat this in two or three months, or as soon as a change is known to have been produced. Such casts furnish accurate information as to the amount of distortion, and the progress made in relieving it, and afford satisfaction to the patient, as well as encouragement to persevere. In slight cases, a blotting paper may be applied along the whole length of the spine, and dotted over the centre of each spinous process, and a plumb-line may at the same time be marked, to show exactly the amount of curvature that may exist ; and this may be repeated at even shorter intervals, by re-applying the same paper.

The average rate of improvement, in cases where the lateral deviation is an inch and a half or two inches, is half an inch the first month,

and an eighth of an inch every succeeding month. In rare cases, Mr. Ward thinks he has done better, when the subject was young, and the progress of the disease rapid. He admits, however, that he does not by any means restore lateral curvatures perfectly straight in all cases—that under the best means he could use, “many would diminish one half or two thirds, or to within a quarter of an inch of straight, beyond which point no advance could be made, however faithfully applied, although there was no disease of the bones.” Had he however combined the sigmoid extension of Guérin, or adopted it after trying his own plan, he would have produced an entire straightness with more certainty,—an important point, since the nearer the spine is brought to this by treatment, the less liable will it be to relapse.

There will occur in bad cases of lateral curvature of long standing, ankylosis of the vertebræ, and sometimes of the compressed ribs. In all such cases, the patient must be content with palliatives in the form of supports, as any attempt to stretch the spine can do no good, and may produce serious evil. Among the signs of an ankylosed state of the vertebræ will be the unyielding nature of the curve, when the hand is placed on the convex side, and also its fixedness when the head and shoulders are bent back or forward as far as possible.

ANGULAR PROJECTION OF THE SPINE ; COMMONLY CALLED HUMP-BACK.

Arranging spinal distortions in the order of their frequency, we come next to consider *hump-back*. This results from the loss of structure of a part of one or more of the bodies of the vertebræ, which form the anterior support of the spinal column. This produces a sharp projection backwards, with more or less irregularity in the shape of the chest, elevation of the shoulders, spreading out of the ribs, the false ones being everted by the upward pressure of the abdominal viscera, and thus producing the appearance which is called *chicken-breasted*. There is also a wasted condition of the parts below the distortion. The deformities will however depend much on the nature and position of the disease in the spinal column. If in the dorsal vertebræ, the chest will be flattened, either at its anterior surface, or laterally, or one side may be more compressed than the other. If seated in the cervical vertebræ, the chest will be flattened, and the sternum drawn downwards and inwards, and, on account of the inaction of the scaleni muscles, there will be difficulty of breath-

ing. Ordinarily the most striking mark of hump-back, on viewing the patient in front, is an elevation of the shoulders towards the ears. Should the lumbar vertebræ be the seat of the affection, the chest settles down towards the pelvis, so as sometimes to bring the ribs in contact with the crest of the ilium.

The disease is not, like lateral curvature, confined to females mostly, but attacks both sexes alike. It appears much earlier in life, most commonly before the fifth year; and it is more likely to run in families, from the fact that a tendency to it is often founded in scrofula.

The disease, however, arises from three causes: caries of the bodies of the vertebræ, ulceration of the interposed cartilages, and a scrofulous condition of the spinal column. In most cases the disease is dated by the patient or its friends to some external injury, as a fall, or blow, or some sudden shock or jerk. Three cases are now present to my mind, where a child fell upon the floor at the age of three years, one that was hit by a brick-bat, one that was kicked in the back at school, two that strained their backs in jumping, and several others who are unable to assign any such injury.

It is apt to be attended at an early period with numbness of the limbs, or an uneasy feeling, pain in the back, great difficulty in ascending a hill or stairs, palpitations, oppressed breathing, and pains in the head. As the disease advances, the parts below become more or less paralyzed, and the sphincters lose their power. In some cases the patient will be able to stir about for some time after the accident, as if nothing had happened; in others there is an immediate attack of benumbing pain in the back, and total loss of muscular power. The disease often ends in ankylosis, and the patient is apparently well for life, although the deformity is very considerable. It is the opinion of Mr. Shaw and others, that paralysis is not always proportioned to the amount of pressure on the spinal marrow. Dr. Hunter attended a patient who was able to walk to the day of his death, and was free from palsy; and yet there was an evident encroachment of one of the vertebral bodies upon the spinal marrow, compressing and diminishing it to half its natural size. Mr. Hunter says that had he not carefully watched every symptom of the disease, he should have thought, from the state of the preparation, that all the parts below compression must have been paralyzed.

Treatment.—Some difference of opinion has existed as to the best mode of treating angular projection,—less so, however, than that of lateral curvature. Mr. Pott's writings have had higher authority and

influence with the profession for many years than any person's. His name is so identified with it, that on the continent this form of distortion is called the "*maladie du Pott*." He was the first to give an accurate account of its pathology, and his system of treatment, making allowance for peculiar cases, and for some new medicines that have been since discovered, is on the whole the best that has been proposed. It is nearly all comprised under the head of counter-irritation, as issues and blisters. Unfortunately, Mr. Pott's high authority, and the general deference paid to him, have swayed the profession into the belief that all kinds of spinal distortion should be treated with counter-irritants indiscriminately; and hence an egregious error has been committed of late years, in inflicting issues, setons, actual cautery, moxa, tartar emetic ointment, and every torment of the kind that physicians could lay their hands on, until these remedies have fallen into disrepute in all kinds of distortion.

The leading indications are to prevent the increase of distortion as soon as possible, to stay the progress of ulceration of the vertebræ, and to produce ankylosis. The first is answered by taking off the super-incumbent weight from the part diseased, either by assuming a horizontal position or by artificial supports. In lateral curvature, a dorsal recumbent position was recommended; but in this a facial one is preferable, as it not only removes the pressure of the head and shoulders, but prevents the abdominal muscles from contracting and drawing the sternum towards the pelvis, and if the sternum projects, as it sometimes does, the weight of the body will compress it.

It is necessary to avoid violent shocks and sudden motions. I have known a child apparently cured with a small hump, who broke up the ankylosis by falling whilst running, and thereby caused death. For the same reason, strong extension should be avoided.

In all cases of angular projection there is a tendency to suppuration, which our best directed efforts cannot always prevent. This may point in different parts of the spine, or descending into the pelvis may appear by the side of the tuberosity of the ischium at the groin, or like lumbar abscess under the fasciæ of the thigh. It never breaks into the large cavities through the pleura or peritoneum. But it is not uncommon for it, when the whole body of the vertebra is destroyed, to press on the spinal marrow and produce paralysis,—or, the inflammation, extending from the bones or intervertebral cartilages to the coverings of the spinal marrow, may produce the same effect,—or lastly, the acuteness of the angle formed by the entire

destruction of two or three bodies may cause a bony compression of the spinal marrow. Hence it is that we so often find numbness and emaciation of the lower extremities, accompanying angular projection. Nature, however, makes wonderful efforts to overcome the paralysis. Mr. Abernethy used to exhibit a patient in St. Bartholomew's Hospital, that recovered after being paralyzed more than two years; and Baron Larrey was fond of showing a skeleton where the like effect existed a still longer time, but yielded as he thought to moxa,—three lumbar vertebræ being destroyed, and the contiguous ones united by ankylosis. Surgical aid should be called early, and all exercise suspended. A chronic inflammation caused by any accident is progressive, and will end in caries of the bone, or ulceration of the interposed cartilage, and consequent angular projection. If ulceration begins in the centre, side or anterior part of the intervertebral substance, it very soon comes in contact with the bone, and produces a disease of its cancellated structure.

“Lateral curvature may also result from this cause, for when the centre of the intervertebral substance is the primary seat of the disease, it may extend itself either forwards or sideways, and would therefore produce two different results, viz. angular projection when the anterior part of the bone participates in the disease, and lateral curvature when the sides of the bodies of the vertebræ are affected.” (*Tuson.*)

Mr. Tuson gives a view of Mr. Venal's apparatus with a patient upon it, which allows the person a convenient table for his book or plate; by a similar arrangement a young lady might play upon the piano. The contrivance may be useful in lateral curvature as well as angular projection.

The *spinal relievér*, of which several kinds have been invented by Shaw and Abbie, and particularly that of Mitchell and of Kissam, will be of service in some cases; while it is worn, the deformity cannot increase, the weight of the head and shoulders being entirely taken off. In this case it is that the cuirass is valuable.

In very young children, as also in others, some advantage will be gained by wearing a small busk when not on the inclined plane. It should be firm and thin. In a recent case, where the disease came on when the child was only two years old, and where every thing looked discouraging, a cure was effected by wearing splints, in connection with other treatment. Suppuration advanced, and a large quantity of sero-purulent matter was discharged spontaneously at the

thigh ; yet the recovery was complete, with ankylosis of two or three vertebræ, and with some projection. This the surgeon should always expect, and should inform the friends accordingly. Any attempt to extend the spine, as recommended in lateral curvature, might defeat the efforts of nature to form ankylosis, which is the only mode she takes to effect a cure. The utmost that can be safely done in this way is, to take off the superincumbent weight, to preserve the diseased bones in apposition and quiescent, until a gelatinous substance is deposited in the diseased part, followed by osseous matter, that fills up the space of bone and cartilage, producing ankylosis. Hence the importance of rest and a recumbent position.

The second indication is to arrest the morbid tendency of the bones to caries, and prevent the formation of matter,—by counter-irritation. Among the best counter-irritants are caustic issues, veratrine ointment, and setons. If there be strong marks of scrofula, and especially an hereditary taint, the issues and seton are not so good as iodine ointment, and ointment of the hydriodate of potash. These may be continued on each side of the spinous processes of the projection for some weeks or even months. The discharge is to be continued for months, and the general scrofulous tendency should be treated with iodine internally in varied forms, *vinum ferri*, and *liquor potassæ*,—with frictions, ablutions, sea-water bathing, a good diet with plenty of milk.

EXCURVATION, OR POSTERIOR CURVATURE.

This comes next in the order of frequency. It differs from hump-back in being a gradual curve, such as is often seen in very old men who have suffered much from rheumatism ; and the shoulders do not rise towards the ears. Its seat is more in the dorsal and cervical vertebræ. The patient is not affected with severe pain, but there is a sense of constant uneasiness, a disinclination to move, and coldness of the extremities, sometimes paralysis. It is sometimes caused by a softness in the structure of the bodies of the vertebræ, and of the intervertebral substance, by reason of which the extensor muscles are unable to retain the column in the erect position, and the anterior muscles of the trunk bend the body forwards.

It generally appears before the age of puberty, and more particularly when dentition is in active progress, whence it has been supposed that this process has some influence in promoting its development ; it is however known to occur at a later period of life. It may

exist for years under the appellation of rheumatism in the back ; and in this state ankylosis may and often does take place, causing stiffness of the back. If the cervical vertebræ are the seat of the affection, they form an arch, the head falls forward, and the chin is brought near to the chest.

As caries with angular projection has some resemblance to excoriation, it is necessary to distinguish them. The curve is here more of a gentle swell, not angular or prominent like the other. Lumbar abscess occasionally presents a roundness, which might be mistaken for posterior curvature of the loins.

It is stated by high authority that enlarged mesenteric glands, by pressing against the bodies of the vertebræ, cause them to become softened, at the same time that they prevent the free flow of the chyle into the thoracic duct, and thus cause emaciation and diminished nourishment to the bodies of the vertebræ. In such cases the disease is founded on scrofula, and must be so regarded in the treatment, which should be by liquor potassæ, iodine, and tonics generally, with generous diet, among the best articles of which is new milk.

If the disease proceed from mollities ossium, the same alterative, tonic and nutritious course should be pursued. If founded in chronic rheumatism, frictions, liniments and stimulating plasters will relieve the pain and uneasiness. If ankylosis has not formed, there will be less risk in this disease, than there is in angular projections, in endeavoring to straighten and support the back.

ANTERIOR CURVATURE, OR INCURVATION OF THE SPINE.

This is of rarer occurrence than other kinds of distortion, and from the rapidity of its progress is more serious. It is apt to embarrass the thoracic, abdominal, or pelvic cavities, according as it happens to project into either of the three organs, and it produces great external deformity. It may arise from the same causes as the other distortions, and also from rickets, mollities ossium, syphilis, scrofula, &c. It is produced in the loins by the early shortening of one limb, and by hip disease. If founded in constitutional disease, the nature of it should be ascertained before commencing the treatment. "In most cases, our diagnosis may be accurately formed from the general symptoms that accompany the primary disorder ; thus rickets may be known from some of the bones, as those of the leg or arm, being softened and bending under the weight of the body—mollities ossium,

which is very rare, from great pains over the body, feverish and scorbutic symptoms, startings, inquietude, and a copious white sediment in the urine—syphilis and scrofula, from the distinctive character of their respective diseases, which are too well known to require any particular description.”

It is unnecessary to dwell on the nature or treatment of the predisposing constitutional disease. The distortion requires, in all cases, artificial support and gradual extension. The apparatus for these should be frequently examined, as there is danger, when rickets exist, of their injuring the bones of the pelvis. Light wood splints affixed to the curve by means of rollers, are of great use in preventing extreme curvature. Cases have occurred where the back part of the head has nearly rested on the sacrum; and one of these, reported by Dr. Harrison, was perfectly cured. The plan pursued was extension by means of pads placed just between the head and the sacrum, and as soon as any part yielded to it, the improved position maintained by artificial supports, and then more extension employed till farther improvement took place; by continuing this treatment, the patient was ultimately quite restored to a healthy and symmetrical form.

RICKETS, AND MOLLITIES OSSIUM.

Having finished the subject of what are strictly called spinal distortions, it seems proper to advert to a disease of the vertebral column, which sometimes, but not generally, exhibits distortion; I mean rickets. The name is derived from *rachis*, or spine, and is, in technical language, sometimes written *rachitis*, or inflammation of the spine. We have already adverted to this disease as a frequent cause of incurvation, and it may be connected with other forms of distortion; but on the other hand, the spine may be shortened by rickets, without deviation of any kind, and it should therefore be considered by itself.

Rickets is characterized by crookedness of the long bones, particularly the legs, by swelling of their extremities, prominent abdomen, large head, and often precocity of intellect, by leanness, general debility, indigestion, &c. It occurs in early childhood, in damp or confined situations, under bad nourishment. Its progress and termination are variable. Some eminent men have identified this disease with scrofula, but it is very remotely connected with it, thinks M. Guérin, whose opinion is founded on 500 cases, and who has bestowed more attention on it than any other person.

It has also been confounded with mollities ossium, which it very nearly resembles; but rickets invades the system at the age of one or two years, whilst *ramollissement* is preceded by a general vice of the system, as syphilis, scurvy, rheumatism, cancer. Unlike these diseases, rickets attacks the skeleton by fractions, one after another, and is very slow in its progress. When it has invaded the skeleton generally, it gives to it the appearance of being pressed down shorter, and the lower edge of the false ribs being everted by the shortening of the vertebral column, gives the appearance called *pigeon-breasted*.

Its morbid changes in the skeleton begin at the base, or lower limbs, so that the spine generally becomes affected after the pelvis. "It very rarely begins in the spine," not oftener than in one case out of forty, and the cases of rickety legs without rickety spine are as ten to one. The disease does not extend to the spine until it has existed in the legs about one year. Hence it may be inferred that where curvature or other distortion of the spine is not preceded by rickety legs, it is not caused by rickets. It affects the spine between the second and third year.

The *treatment* of rickets is almost wholly hygienic. Pure air, a healthy situation, nourishing diet, exercise, sea or common cold bathing, and tonics, afford the best prospect of success. The spine should be exercised by rubbing and shampooing.

LUMBAR, OR PSOAS ABSCESS.

This is a disease of the lumbar vertebræ, commonly of the anterior surface of the bodies from the outset; at other times it begins in the soft textures contiguous to them, and extends not only to their surface, but ultimately to the cancellated structure of the bodies. Although the seat of the disease is in the lumbar vertebræ, where ulceration takes place and large collections of matter form, yet the pointing of this is various, so as to puzzle the young surgeon in identifying its nature. The matter may point at the lumbar region, at the groin, at the inner part of the tuber ischii, and under the fascia of the thigh.

The disease of the vertebræ, in these cases, may be the result of accidental sprains or concussions, by violent exertions and carrying heavy loads. It may also spring from constitutional causes, as scrofula. Abscess may form and point at the same places, when the dorsal vertebræ are the seat of the caries; but in such cases, the di-

aphragm, if the disease be near its crura, will suffer some embarrassment in deep inspiration, and besides we may determine nearly the seat of the disease by the sensibility of the part to pressure.

Psoas abscess is characterized by unremitting pains in the loins, which are increased by exercise. Commonly the first suspicion of the existence and true nature of the disease is awakened by the appearance of a large tumor, soft and fluctuating, in either of the situations before mentioned, most generally below Poupart's ligament, which lessens somewhat in a recumbent posture, and hence is apt to be confounded with femoral hernia. There will however always be some pain in the loins, difficulty in straightening up when rising from a chair, and when lying on the back there will be a weakness felt on raising up the thigh, in consequence of the pressure of the matter on the psoas muscle.

Ordinarily the disease may progress to a fatal issue, without producing much or any distortion of the lumbar vertebræ. I have, however, seen cases that caused angular projection; the deformity, if there be any, will depend on the number and extent of the diseased vertebræ.

The constitutional derangement produced by this disease varies. I have known several persons who kept about their usual occupations, complaining little, until a tumor had appeared and existed for some time in the thigh, and after the contents of this tumor had been repeatedly drawn off. But when the disease becomes aggravated by the admission of air into the sac at the loins, great suffering ensues, hectic fever, debility, pain, restlessness, loss of appetite, profuse perspirations. In some cases there is palsy of the lower extremities. The leading aim in the cure is to effect ankylosis. To this end, the prominent indications are rest in a recumbent position, discharge of the matter, when it points near the surface, by a valvular opening of the swelling, which may be repeated as often as it fills, care being taken to prevent the introduction of air while the fluid is escaping, and to cover the opening with adhesive plaster and compresses, so that it may heal by the first intention. A frequent repetition of the opening may gradually contract the dimensions of the internal cavity, and thus tend to a cure.

The local treatment should be issues, constantly and perseveringly applied over the part affected, and strengthening plasters wherever there is room for their application. When a curvature begins to appear, spinal supports best adapted to the case may be of service.

Where scrofula is suspected to lie at the root of the evil, iodine should be freely administered. Tonics and nutritious diet will be necessary to support the strength under the constant drain. Every means that can tend to support and strengthen the system should be tried.

INJURIES OF THE SPINE.

When the spine is fractured, death usually ensues from compression of the spinal marrow. This may be produced by the displacement of a vertebra; or a fragment of the arch behind the body may be forced in so as to lacerate or even divide the marrow; or there may be an extravasation of blood that will compress the marrow; or, lastly, the theca vertebralis which surrounds it, may from inflammation swell and compress it.

It is not every case of fracture, therefore, which produces palsy immediately or soon after, that necessarily proves fatal; extravasated blood may be absorbed, and swelling may subside and liberate the marrow from compression. Nor is this all; a considerable degree of compression, say of one fourth or even a third of the marrow, may exist consistently with the performance of its functions. The case related at page 30 confirms this fact.

The effects of such injuries as prove fatal, are paralysis of the parts below; and consequently their extent must depend on the situation of the injury, whether it be high or low in the column. If it be high in the neck, as is usually the case in executions, death ensues instantly; if low in the neck, respiration is not immediately prevented,—in one case which I have seen, the patient sank gradually in a few hours; in the dorsal vertebræ, the patient may live two or three days. In two cases that have come under my care, one lived three or four days, and the other a week: the first of these plunged into water from a height, and struck his head on a hard sand bottom, the water being shallower than he was aware of, and fractured his spine; the other fell from the top of a house-frame, with his back across a piece of timber, and displaced two vertebræ with fracture of the oblique processes. In such cases the paralysis affects the contractile power of the hollow muscles below, as of the rectum and bladder, causing retention of their contents; but after a time, the bladder by becoming distended overcomes the resistance at the neck, and pours out its contents in a constant dribbling.

It has been attempted by Mr. Clyne and Mr. Tyrrell to remove a portion of the depressed bone; but the cases proved fatal, and most

authors advise to abstain from such experiments. Extension, which is proposed by some, I know from observation to be the extreme of torture, and not likely to prove beneficial.

The treatment in such cases should be entire rest, local bleeding with leeches, evaporating lotions, cleansing the bowels with enemata, drawing off the urine, and anodynes.

INFLAMMATION OF THE CANCELLED STRUCTURE OF THE VERTEBRÆ,
AND OF THE INTERVERTEBRAL SUBSTANCE AND SURROUNDING
MEMBRANE.

We have already dwelt on the occasional effects of these inflammations now under consideration, in the form of posterior and angular distortion, and psoas abscess; but they often exist without any such consequences, and hence they seem entitled to a separate chapter. The textures here involved are subject to inflammation from strains, over-action, external violence, and constitutional affections, and once commenced it is likely to be protracted by the constant motion of the spine, till it at length involves the spinal marrow, by causing a swelling of its investing membrane. It is apt to form an abscess in the back. A lady, after walking fast a long time, felt something give way near the upper lumbar vertebræ. In about three months, she had constant pain in the part, and after a few weeks there was a small fluctuating tumor near the end of one of the transverse processes. This was punctured, and discharged about a table-spoonful of matter. Soon after, cold shiverings and rigors, followed by fever, set in, and soon extensive suppuration, which seemed to extend upward along the spine, and in a few weeks longer produced death by extreme nervous irritation.

Another case occurred of a man who sprained his back in lifting, and felt something give way. Soon after, violent inflammation set in, a tumor formed over the lumbar vertebræ, but the matter was so deep-seated that there was some doubt of its existence. Reflecting on the magnitude and density of the fascia of the sacro-lumbalis and longissimus dorsi, and the consequent difficulty of bringing the matter forward, I made a longitudinal incision through the fascia, two or three inches long, over the part, and one inch deep, and directed cataplasms to be continued. The advantage thus gained was, that the matter soon reached the incision, and bursting through, relieved the patient much sooner than without it, thus probably saving his life.

But in all such cases of severe local pain, resulting from sprain, and not threatening suppuration, leeches and cupping are to be used freely, and rest. The spinal supporter may be serviceable. It may be fixed with crutches under the arms, resting in a belt surrounding the hips.

SPINA BIFIDA, OR HYDRO-RACHITIS.

This is a malformation which occasionally presents itself to our notice, and consists of an elastic swelling, that is generally situated in the loins, but sometimes appearing on the back of the sacrum, and occasionally in the dorsal and even cervical vertebræ. It proceeds from imperfect development of the arch of one of the vertebræ, and absence of the spinous process. The spinal membranes, deprived of their ordinary support, yield to the pressure of the fluid which they contain—which also is secreted in unusual quantity—and bulge out, forming a fluctuating tumor in the middle of the back. Sometimes the tumor becomes pendulous. The legs are often palsied. Pressure on it will produce convulsions and coma. It is supposed that the fluid communicates with the lateral sinuses through the fourth ventricle of the brain. The ordinary course of the case is, that the tumor enlarges, the skin becomes distended, inflames, and ulcerates, the fluid is discharged, the spinal membranes inflame, and the patient dies. In some rare cases, however, the skin being stronger, the patient may survive to adult age, and in one or two that I have heard of, have worn a silver cup over the tumor. Mr. Tuson says he has seen ten cases of the disease, all of which proved fatal. I have seen only three, all which, though differently treated, were fatal; one at the age of two months, one of a year, one only three weeks.

The most successful treatment I have recently heard of was that adopted by Mr. Dubourg, which I will extract from the *Gazette Medicale* of Paris, of July, 1841. After detailing his failure in one case, he gives two cases where he succeeded.

“In the spring of 1837 I was called to a female infant, eight days old, who had a congenital pediculated tumor on the lumbar region, about the size of an apple. Its color was livid from the development of a venous net-work, giving it the appearance of a vascular fungus. It was evident, on examining the vertebræ, that they were defectively formed, the edges of a bony opening being discovered. The tumor was opaque, its walls much thicker than usual, and it ap-

peared that the arrest of development was confined to the last lumbar vertebræ, the child being otherwise healthy and well-formed. Having the cautery in readiness in case of severe bleeding from the vascular coverings, and being prepared to prevent the sudden escape of the spinal fluid, an elliptical incision was made round the base of the tumor, when a quantity of reddish serum escaped, and the excision of the sac was readily effected. The finger passed readily into the spinal canal. The edges of the wound were brought together, and four needles being passed, the twisted suture was applied, as in the case of hare-lip. The threads were twisted so as to exert as much traction as possible on the contiguous parts, and small compresses were placed at the extremities of the needles to protect the skin. The child cried sharply at the commencement of the operation, but as soon as the fluid escaped from the spinal canal it, fell, for a few minutes, into a state of stupor. It cried again as the needles were applied, and by the time the dressing was finished, it took the breast as if nothing had occurred. The needles and sutures were removed on the fourth day, when the edges of the wound were found to be united. Adhesive plaster was applied, and in fifteen days a strong cicatrix, forming a sort of solid button, filling up the opening in the vertebræ, was all that remained of this reputed incurable disease. The examination of the removed tumor demonstrated that it was a cyst, distended by fluid, communicating with the spinal marrow, bounded behind by the common integument, and an expansion of the arachnoid and dura mater. The cavity was not in proportion to the volume of the tumor, for there were several layers of cellular and adipose tissue between its external and internal surfaces."

EXOSTOSIS.

This disease sometimes attacks the cervical vertebræ, presenting the appearance of a large bony tumor, covering two or three vertebræ, and extending laterally to nearly equal width. The two cases I have seen, one of which was two years under my care, occupied the two lower cervical vertebræ. They both proved fatal by paralyzing the arms and legs, and finally the trunk. Mr. Abernethy describes cases of exostosis of the ligamentum nuchæ. Mr. Cooper had one case which pressed against the arteria innominata, and stopped the pulse. I know of no certain remedy. Mr. Abernethy advised the free use of mineral acids, but, as he confesses, to no purpose.

DISEASES OF THE SPINAL CORD.

The anatomy of the spinal cord was purposely omitted at the commencement of this essay, in order that it might be given in connection with its diseases.

The spinal *column* contains the spinal *cord*, with the roots of the spinal nerves; and the membranes of the cord, viz., the *dura mater*, *arachnoid*, *pia mater*, and *membrana dentata*.

The *dura mater*, sometimes called *theca vertebralis*, is continuous with the *dura mater* of the skull. It is connected to the vertebræ by loose cellular tissue, containing an oily fluid. On either side it forms a sheath for each of the spinal nerves, and adheres to them firmly. Its inner surface is smooth, being lined by the *arachnoid*; and on either side may be seen the double opening for the two roots of the spinal nerve.

The *arachnoid* is also continued from the brain, and encloses the cord very loosely, accompanies the spinal nerves to their exit, and is then reflected over the inner surface of the *dura mater*, forming its serous surface. It is slightly connected to the cord and to the *dura mater* by filaments. The *arachnoid* incloses a serous fluid, sufficient in quantity to fill the intervening space between the *dura mater* and the cord, and to exert a gentle pressure on both. When, however, the *dura mater* is deprived of a bony structure to support it, it suffers dilatation, and the fluid accumulates in the part, constituting *spina bifida*.

The *pia mater* is the immediate investment of the cord, descending likewise from the brain, but, compared with the cerebral covering, is less vascular and more dense. It invests the cord closely, forms a delicate sheath for each filament of nerve, and sends a duplication into the anterior and posterior medial sulci or fissures of the column. It also sends off a membrane from each side of the cord throughout its length, called the *dentata*, which separates the anterior from the posterior roots of the spinal nerves. These duplicatures of the membrane posteriorly and anteriorly and on each side, hold the cord suspended, as it were, in its surrounding serous fluid, and divide it superficially into four quite distinct columns, two on each side, and each of the lateral columns is divided into two others, faintly marked, however, and all of them observed only near the top of the cord.

By this subdivision we have four divisions to each side of the column, viz., anterior, lateral, posterior, and median posterior, which are very small.

The two *anterior* are the motor columns, and give origin to the motor roots of the spinal nerves; near the brain they are called *corpora pyramidalia*.

The *lateral* columns are divided in their functions between motion and sensation, and contain what Sir Charles Bell calls the respiratory tract.

The *posterior* columns give rise to the spinal nerves of sensation, and near the brain terminate in the *corpora olivaria*, or *restiformia*.

The *median posterior* columns, consisting of a slight line merely, one on each side of the posterior median line, have no function at present assigned to them.

Such are the structure and functions of the spinal cord, as understood and believed by leading physiologists of the present day. But another class of nervous powers, connected with the spinal marrow, is superadded to the above, which appears to be well established by experiment, and is consequently admitted by most physiologists to exist, I mean the excito-motory power of Marshall Hall. A leading feature of this doctrine is, that the spinal marrow, or some part of it, is acted on by sensitive nerves, and reflects the excitement thus produced in it upon certain muscles through motory nerves extended to them, and that all this takes place independently of the brain.

Legallois, as long ago as 1812, made an important step in the investigation, by showing experimentally the connection of the sympathetic and excited actions with the spinal cord alone, and that any single division of the spinal cord would act as the centre to the portions of the body connected with it by nervous trunks—not however like the brain, with the property of consciousness either in its reception or transmission of impressions, but by a sort of automatic impulse. The automatic animal motions resulting from this property, Dr. M. Hall has grouped together, and traced out their morbid phenomena. He divides the class of nervous diseases of his excito-motory system into three subdivisions, according as they affect the incident nerves, or those on which the morbid cause acts, leading to the spinal cord, the spinal marrow itself, or the reflex or motor nerves. To follow more exactly his classification of diseases of the spinal marrow and nerves, they are,

I. Centric diseases, or diseases of the true spinal marrow itself.

II. Eccentric diseases, or diseases attacking the incident or excitor nerves.

III. The diseases of the reflex, or motor nerves.

I. Inflammation within the spine.

1. Inflammation of the membranes, or spinal meningitis.

2. Inflammation of the substance, or spinal myelitis.

Of the cerebral, sentient, or motor tracts.

Of the true medulla.

Of its principal divisions.

Congestions, Hæmorrhagia.

Centric Convulsions, or Epilepsy.

Paralysis Agitans, General,

or Hemiplegic.

Tremor Mercurialis.

II. Eccentric Diseases.

Eccentric Epilepsy.

Puerperal Convulsion.

Tetanus.

Hydrophobia.

Hysteria ; Chorea ; Stammering.

Spasmodic Asthma.

Vomiting.

Tenesmus ; Strangury.

Abortion.

III. Diseases of the Spinal Motor Nerves.

Spasmodic Strabismus.

Spasmodic Tic.

Spasmodic Torticollis.

Spasms of the Respiratory Nerves.

The foregoing diseases of the nervous system are more or less connected with a disordered state of the functions of the spinal cord or its investments, and are here introduced merely to show their nature and variety. A full account of each would far exceed the limits of a single treatise like the present. Very few if any of them exhibit any lesion appreciable on dissection, if we except inflammation of the spinal marrow and its membranes, which will now be briefly considered.

It may be divided into inflammation of the membranes, or spinal meningitis ; and inflammation of the substance, or spinal myelitis.

Sir Charles Bell thinks the membranes of the spinal marrow are the most susceptible of inflammation and suppuration of any in the body. Rheumatism, and exposure to cold, and blows or falls, and caries of the vertebræ, are reckoned among its causes. (*Louis.*)

One of these inflammations, whether meningitis or myelitis, seldom exists to any considerable degree without inducing the other; and consequently they are not easily distinguished. The location of the inflammation, whether it affects the medulla oblongata, the cervical, the dorsal, the lumbar or sacral portion of the spinal marrow, is, however, interesting, as a guide in the diagnosis and local treatment.

As a general remark, it may be said, that "the symptoms of meningitis are more those of irritation of the spinal marrow, or spasm; those of myelitis, more of destruction of the organ, or paralysis." Both kinds, however, may exist together, or in alternation, and it is fortunate that the treatment, both general and local, is nearly the same in both.

In meningitis the prominent symptoms are pain in the part affected, augmented by movement, tenderness and pain in the side and along the limbs, spasm in the form of various kinds of muscular contraction in the trunk and limbs, constant or recurrent, aggravated by motion, sometimes convulsions. There is sometimes difficult respiration, retention of urine, and constipation.

In myelitis, there is paralysis of voluntary motion and sensation, impaired sensibility and numbness, and impaired muscular power. These are first observed combined, or singly, in one or both of the lower or upper extremities. In some cases, complicated with meningitis, there may be increased sensibility; and in others there are spasmodic affections or convulsions. (*Hall.*) Commonly the paralysis increases and extends upward. Occasionally we find paralysis of motion alone. But the symptoms vary as to the parts of the system paralyzed or embarrassed, according to the location and extent of the disease, and consequently affect the functions of the bladder and bowels at one time, and at others the respiration.

The post-mortem appearances are, in meningitis, injection, effusion of serum, or of lymph, or of pus, and ulceration; in myelitis, injection, tumefaction, softening, purulent infiltration, abscess, induration; the last is frequent in chronic myelitis. Softening is the most common morbid change of structure.

The following list of cases is the largest I have seen, and exhibits an outline of the symptoms. It was made out by M. Prus, physician to the Sal-petrière.

"Case I. Contraction of the extensors and flexors of both inferior extremities; preservation, but alteration of the sensibility of

these parts. Progressive paralysis of the sphincters of the bladder and rectum; death. Gelatiniform softening of the two inferior thirds of the spinal marrow.

Case II. Sudden loss of speech; deviation of the mouth to the right; progressive diminution in the voluntary power of the left arm; incomplete paralysis of motion in the left side of the face, without any alteration of sensibility; involuntary discharge of saliva; dyspnoea carried to commencing asphyxia; death. Superficial softening of the whole circumference of the medulla oblongata.

Case III. Pricking and loss of sensibility of all the limbs, especially of the inferior; incontinence of urine; sloughs on the sacrum; death. Slight softening of the posterior columns of the spinal marrow, in the portion constituting the lumbar swelling.

Case IV. Loss of motion in the inferior extremities; sensation preserved; acute pains continuing during many years in the lateral parts of the chest; purulent expectoration; hectic fever. Softening of one portion of the spinal marrow; spinal meningitis; caries of the seventh, eighth, and ninth dorsal vertebræ; abscess communicating with the bronchiæ by means of numerous fistulæ; compression of the spinal nerves in their passage through the foramina of the carious vertebræ.

Case V. Progressive paralysis of motion only, in all the limbs; paralysis of the sphincters of the rectum and bladder; spasmodic respiration; sudden death in going to stool. Double softening of the spinal marrow, that is, in the cervical and lumbar portions; the gray matter of the cord invisible in the diseased parts; nearly so in others.

Case VI. Paralysis of motion only in the four limbs, which are slightly contracted; progressive paralysis of the sphincters of the rectum and bladder. Reddish softening in the middle lobe of right hemisphere of cerebrum, and in anterior lobe of left hemisphere; spinal marrow perfectly healthy.

Case VII. Paraplegia during three years; exostosis of left clavicle; treatment by mercury and sodorifics. Successive disappearance of exostosis and of paraplegia."

The treatment, as before observed, is nearly the same in meningitis and myelitis, and consists chiefly in local bleeding by cupping and leeching, particularly the former, in acute cases, and in issues and setons in chronic; in the use of mercury, rest in a recumbent posture, gentle laxatives, and abstemious living.

SPINAL IRRITATION.

The medical reader must ere this time know what is understood by the term "spinal irritation," or, as some call it, "functional disease of the spinal marrow." Although he searches in vain for it in systems of nosology, every periodical presents reports of cases agreeing so nearly in the range of symptoms, and in the mode of treatment found most successful, as to establish the identity of their nature, and, however obscure may be their pathology under the dissecting-knife, to render it at least convenient to give them a local habitation and a name, by which they may be readily recognized and properly treated.

The first writer, so far as I know, who called the attention of the profession to the connection between certain neuralgic symptoms in different parts of the body and spinal tenderness, was Dr. Player, who in 1821 published a short essay describing this connection as often exhibited in his practice, and also the success attending the application of local remedies to the spine in curing affections, however distant their manifestation, to which the nerves arising from the diseased part are distributed.

It is worthy of remark that the simple facts, though known and acknowledged by most of the profession, and republished with innumerable cases in illustration of them, received very little accessions calculated to make these diseases dependent on the spine any better understood. Post-mortem examinations are rare, and have shed scarce a ray of light on their nature or pathology ; and the only additional information on the subject consists in enlarging the range of morbid manifestations in remote organs. It must however be admitted that the doctrine of an excito-motory system, of Marshall Hall, affords the best clue towards unravelling the intricacies of the subject. By this we learn that irritations of the spinal marrow may be idiopathic, or may arise from "some previous derangement in the functions of some organ or organs," transmitted through the incident, or excitor nerves, as from the teeth, the stomach, and bowels, or the uterus, to the spinal marrow, and after a time be transmitted thence by the reflex nerves to other organs and tissues, inducing various neuralgic and spasmodic complaints, so often referred to spinal irritation. It may be said that this idea was admitted before Hall's theory was published. And so it was ; but the reason why teething in children, gastric irritations, and other impressions acting on the spinal cord and through it, are reflected on the muscular and nerv-

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ous system in the form of spasms and convulsions, without affecting in any way the cerebral centre with a sense of pain, is puzzling on any other system than that of Marshall Hall, which teaches that the excito-motory system is independent of the brain.

It would require more space than this essay can afford, to give a detailed account of the symptoms that proceed from spinal irritation. I must therefore present a tabular view of the largest number of cases that to my knowledge have come under the observation of any one individual, and which my own observation of cases teaches me exhibits a correct analysis. I have added a few symptoms, which have occasionally occurred in cases under my own care, which are italicised. The original table is by William Griffin, M.D., of Limerick, Eng.

A. Twenty-eight cases of *cervical* tenderness ; 8 men, 8 married women, 12 unmarried. Prominent symptoms : headache, nausea or vomiting, face-ache, fits of insensibility, cough, dyspnœa, affections of the upper extremities. In 2 cases only, pain of stomach. In 5, nausea or vomiting—*asthma, pain under clavicle and under the scapula.*

B. Forty-six cases of *cervical and dorsal* tenderness ; 7 men, 15 married, 24 unmarried women.

Prominent symptoms. In addition to the foregoing, pain of stomach and sides, pyrosis, palpitation. In 34 cases, pain of stomach ; in 10, nausea or vomiting. *Hæmoptysis, 3 cases.*

C. Twenty-three cases of *dorsal* tenderness ; 4 men, 6 married women, 13 unmarried. Pain in the stomach or side, particularly at the ensiform cartilage, cough, oppression, fits of syncope, hiccup, eructations. In one case only, nausea or vomiting ; in almost all, pain of the stomach.

D. Fifteen cases of *dorsal and lumbar* ; 1 man, 11 married women, 3 unmarried. Pains in abdomen, hips, loins, lower extremities, dysury, ischury, and the symptoms of dorsal tenderness. In one case only, nausea.

E. Thirteen cases of *lumbar*. Pains in lower part of abdomen, dysury, ischury, pains in testes or lower extremities, or disposition to paralysis. In one case, spasms of stomach and retching. *Tenesmus 2 cases, and acute pain in the labia pudendi in 2 cases.*

F. Twenty-three cases, all spine tender ; 4 men ; 4 married women, 15 unmarried. All the above symptoms combined, excepting those I have added.

G. Five cases, no spinal tenderness; symptoms like the foregoing.

In all local pains about the trunk and limbs that wear the aspect of neuralgia or convulsions, for which no adequate cause is assigned, I am in the habit of trying the tenderness of the spine, and in a large majority of cases find it distinctly marked. In respect to those where this symptom is wanting, but which in every respect resemble the others, are we to consider the spine as implicated, and treat it accordingly? This question most therapists would answer in the affirmative. The centric irritation, as Mr. Hall would call it, may be in the roots of the nerve within the spinal canal, where being enclosed in a bony covering, the usual tenderness might not extend to the integuments, so as to feel the painful pressure of the fingers, and may yet have the same character, and be as susceptible of relief from local depletion and revulsion, as if the irritation existed in the nerves after their exit from the osseous canal. Marshall Hall states that even inflammation of the cord and its membranes may exist unaccompanied by tenderness of the spine on pressure.

Among the most remarkable neuralgic diseases connected with spinal irritations, I have found to be those which result from repelled irritations on the surface; and as these have in a great degree escaped the notice of the authors I have read, I will subjoin a few cases.

Miss H. had long had a pimpled face—acne—to remove which she used a cosmetic containing a preparation of the oxyde of lead. Soon after its disappearance she complained of a numbness of one hand, followed by clonic spasms or twitchings, which soon increased and involved all the limbs. These increased in violence, and gradually involved the whole system in general convulsions, and caused her death. Early in the disease there was tenderness on pressure of the nape of the neck. Counter-irritants were applied over the part, and produced temporary abatement of the spasms, but they soon returned and proved fatal.

A case of itch was suddenly cured, and was followed by chorea. In this case there was tenderness of the spine. The symptoms yielded to counter-irritation and mineral tonics. Cases exactly similar have been cured by restoring the itch. These occurred before attention was directed to the spine, but from the correspondence of symptoms and course of the muscular contractions, there is no doubt spinal-irritation existed. From these cases it would seem that the

sudden suspension of an accustomed stimulus in the skin, has equal effect in disturbing the action of the spinal nerves, as the positive irritation of teething, or of the gastric organs.

Many times I have known tenderness of the spine and various neuralgic affections to alternate with cutaneous diseases; probably by metastasis, as the nervous affections yielded to permanent irritations on the skin. The sudden drying up of humid tetters on the skin in young children, I have known to produce spasmodic twitching of the arm. So intimate indeed is the sympathy between the skin and the spinal marrow, that Guérin, in his *Etiology of Lateral Curvature*, refers to it as a proof that disorder at the root of the spinal nerves, caused by repelled cutaneous disease, influences the spinal muscles of one side more than those of the other, either in the form of tonic spasm or palsy, so as to produce lateral curvature. I may further add, that in conversation with Dr. Abbie, of the orthopedic institution, he spoke of transferred irritations from the surface as among the most frequent causes of spinal irritation.

The tabular view I have given places thoracic diseases among the most prominent. I have had two cases of consumption in one family, besides others elsewhere, that are worthy of particular notice. In the first case, the complaint of ill health began in an excited state of the voluntary muscles, extreme uneasiness, changing posture in the chair, jerking of the arms, some wandering pains in the trunk and limbs that were hardly definable. To these succeeded involuntary twitchings of the arms, resembling chorea, rendering the patient unable to write, and even to feed himself. Suspecting spinal irritation, I found on examination the lower cervical and first dorsal vertebræ extremely tender. I now applied cups daily over the part, took him with me on a journey to the Springs and to the sea-shore, and his symptoms all subsided, and emaciation was succeeded by full health. It lasted, however, but a few months, when pain commenced in the side, cough, loss of strength and flesh. He took a journey south in March, where exposure to bad weather aggravated his symptoms, and he died the following summer of tuberculous consumption. The evidence furnished by this case goes to show that tubercles may exist, and become a source of nervous irritation, by creating tenderness of the spine, from which the same irritation may be extensively radiated throughout the system, without any decided local manifestation of disease in the part primarily affected. The lungs transferred their irritation to the spinal marrow and made it the focus of disease,

and from this it was radiated throughout the muscular system by the reflex motory nerves described by Marshall Hall. Here then we have a case illustrating his views of the location of disease in the incident, the centre, and the reflex order of nerves ; but finally proving fatal in the organ primarily affected.

The sister of this patient was attacked, while in the enjoyment of perfect health, with hæmoptysis, which recurred frequently, and was succeeded by slight cough and some wandering pains about the chest. There was also a general irritability and restlessness, with some tenderness of the spine. Travelling in the south, and passing a winter in a warm climate, with exercise and extreme care, kept the progress of the phthisis in check for more than a year, and was tried a second winter, but the disease of the lungs is actively progressing, and from present appearances she will not reach a third winter. From this case I infer that the hæmoptysis lessened the amount of irritation in the excitor nerves, and consequently in the spinal centre, and hence the reflex morbid affections were far less than in her brother, yet the lung affection progressing steadily will prove fatal at last.

The cases are interesting, as showing the importance, in chronic visceral disease, of having an eye to the spine. We may not be able to do much towards curing the primary disease, if it be tubercular phthisis, but the morbid influences which it sends to the spine may there be so far mitigated as to remove all reflex disease flowing from it.

I need not advert to the morbid influences shed over the system by hypochondriasis and hysteritis, originating in the liver and uterus, and propagated to the spine. Dr. Tate, of London, after extensive experience, added to profound attainments, "has not hesitated to publish the opinion that the appalling and anomalous symptoms presented in the hysterical female are all capable of being referred to an irritation existing in some portion of the spinal marrow, originally induced by a disordered state of the uterine function. He was led to this conclusion by observing that tenderness on pressure over the spinal column was a uniform attendant and characteristic of these complaints, connected almost uniformly with pain under the left breast, and palpitation of the heart. These four symptoms, viz., disordered menstruation ; spinal tenderness, most generally evident over the upper dorsal vertebræ ; pain under the left mamma, and sometimes under the right ; and palpitation of the heart, may be dis-

tinguished among a multitude of frightful appearances, in almost all cases of chronic nervous disorder in young females, and when they are conspicuous Dr. Tate considers them as constituting a peculiar and distinct disease, which, to avoid confusion, he proceeds to call hysteria.

Treatment.—In examining any case that presents itself, which exhibits the symptoms detailed in the tabular view, if we can detect any tenderness of the spinal column with general nervousness, we are to direct our attention first to the removal of the spinal tenderness, and secondly to the organ primarily affected, whether the skin, the thoracic, the abdominal, or pelvic viscera.

Of all the remedies I have tried under the first indication, cupping has been most beneficial. Leeches are nearly as valuable, but, besides the trouble of making them draw, which to a nervous patient is very annoying, they act only by depletion, while cups draw the blood from the deep-seated parts toward the surface, and may be used for this purpose alone, as well as for the extraction of blood. Nearly all writers recommend local depletion, except Dr. Tate, who prefers strong counter-irritation. The cupping should be practised daily at first, with the scarificator chiefly, but as the disease begins to yield, dry cupping should be gradually substituted. I usually begin with applying three or four cups with the scarificator, on both sides of the spine, and as many dry cups. I have sometimes found two portions of the spine affected with tenderness, and in such cases have noticed a corresponding range of the reflex disorders in different parts of the trunk. In these the remedy was applied to both portions of the spine with corresponding relief.

The next remedy is counter-irritation, which should be proportioned in its strength and permanence to the duration of the disease. In moderate cases, camphorated volatile liniment, with or without the addition of spirits of turpentine, may be applied immediately after the cupping, or in slight cases of tenderness this liniment without cupping may answer, but in all severe cases of tenderness, and consequent diseases elsewhere, local bleeding should precede the stimulating applications. I have known all the symptoms aggravated by a blister or other irritant over the tender portion of the spine, where bleeding has not preceded.

The next most important remedy is travelling and change of residence. Mr. Rogers speaks of it in such strong terms of approbation, that the reviewer of his book regards its efficacy as proof that

no disease of the spine exists. (British and Foreign Med. Review, 1836.) I have always noticed marked good effect from it.

Carbonate of iron, given as freely as the patient can bear, I have always found serviceable, after cupping or leeching. The acetate of iron, Griffith's myrrh mixture, and various other forms of chalybeates, are worthy of trial. The vegetable tonics have not in my practice proved beneficial.

ORIGIN AND OBJECT OF THE FISKE FUND.

THE Fiske Fund of the Rhode Island Medical Society was established by bequest of the late Dr. Caleb Fiske, of Scituate, R. I. He formerly held the office of President of the Society, and although for some years previous to his decease, the cares of age and the more immediate concerns of life had withdrawn him from all active personal participation in the Society's affairs, still he always expressed and manifested a desire for the advancement of its best interests, the improvement of medical science, and the elevation of the medical character. In his case, at least, the homely adage, "out of sight, out of mind," did not prove correct; his deeds did not contradict his words; and if during his closing years, he said less respecting his favorite object, he evidently thought the more; and his last acts clearly evince that to him applied, and by him might have been not inappropriately selected, the motto,

"Res non verba quæso."

The estimation in which he was held by his associates may be seen by the following resolution, unanimously passed at the annual meeting of the Rhode Island Medical Society, held at Newport, June 24th, A. D. 1835, the President, the late Dr. Charles Eldridge of East Greenwich, having announced his death.

"*Resolved*, That we deeply sympathize with the relatives of the late Dr. Caleb Fiske, one of the former Presidents of this Society, on account of the loss we have sustained by his decease; cherishing his memory as we do with respect for his professional learning and usefulness, and with gratitude for his liberal bequest to this Society."

We extract from his Will, the following paragraphs which relate to his bequest, as thereby will be more clearly seen the great object he had in view, and the means by which he proposed to attain it.

"*Item*.—I give and bequeath to the President and two Vice Presidents of the Medical Society of the State of Rhode Island, for the time being, and to their successors in office, the semi-annual dividends arising from forty shares of stock which I own in the Union Bank in Providence, the amount thereof two thousand dollars, in trust, for the uses herein limited.

Use the first: nine-twelfths of said dividends shall constitute a fund to be applied in the manner following; to wit. The said Trustees, or either two of them, shall select at every annual meeting of said Society, such

subject or *subjects* for investigation as they may judge most conducive to the advancement of medical science, and give notice thereof in one of the newspapers published in Newport, and one published in Providence, for the term of six weeks; offering such premium or premiums as the annual product of said fund will justify, to be awarded and paid out by said Trustees for the best Treatise on the subject proposed by them for investigation, to be communicated to said Trustees one month previous to the next annual meeting of said Society; and in order that a laudable spirit of emulation may be excited and maintained, the Trustees shall not only suitably reward the authors of the fortunate productions, but also prescribe such *rules* for receiving the communications and deciding on the merits of the several performances, as will shield the unsuccessful competitor from obloquy or reproach.

Use the second: two twelfths of the profits or dividends are to remunerate said Trustees for their services in the execution of the several trusts herein confided to them.

Use the third: one twelfth of the profits of said stock is to be appropriated to printing, and supplying each member of said Society with a copy of, such Treatise, for which premiums shall have been awarded."

The officers designated in the will held their first meeting at Newport, June 24th, 1835, and by adjournment at the same place, July 8th, of the same year. At this meeting they established certain Rules for their own government, and Regulations relative to the reception of Dissertations on the Questions that might from time to time be proposed for Premiums.

The Premiums have varied from forty dollars to one hundred, and the Questions at any one time proposed, have ranged from one to three. As the regular income of the fund will now admit of offering annually two Premiums, each equal in amount to that of any elsewhere offered for a similar purpose, the Trustees are in favor of pursuing that course for the future. For several years the privilege of competition was confined to the members of the Rhode Island Medical Society; but of late years it has been extended to the profession at large, the Trustees believing that this course would best accord with the liberal and enlightened views entertained by him through whose munificence the Fund was established.

The Questions proposed for the Premiums to be awarded at the annual meeting of the Society to be held at Newport on the last Wednesday in June, A. D. 1843, are the following, viz.:

Question 1st. What are the causes, character, nature and best mode of treatment of Asthma?

Question 2d. What are the causes, character, nature and best mode of treatment of Mammary Abscess?

For the best Dissertation on each of these Questions, the Trustees will award and pay the sum of Fifty Dollars.

Every competitor for the premiums is expected to conform to the following regulations, viz.:

1st. To forward to one of the Trustees, on or before the 10th day of May, A. D. 1843, free from all expenses, a copy of his Dissertation, with a motto written thereupon, and also accompanying it a sealed letter, having the same motto inscribed on the outside, and his name and place of residence within. Both Dissertation and letter must be written in a clear and legible manner.

2d. Neither a name or any other mark shall be put upon the Dissertation, or any accompanying paper, (save in the manner above designated,) whereby the author will be known to the Trustees.

3d. Previously to receiving the premium awarded, the author of the successful Dissertation must transfer to the Trustees all his right, title and interest in and to the same, for the use, benefit and behoof of the Fiske Fund.

It is the wish of the Trustees that the Dissertations should possess as little of a theoretical, and as much of a practical, character as possible; it is therefore recommended that the writers dwell no more upon the *theory* of the causes and nature than they may deem necessary for a clear understanding of the principles by which they were guided in the selection of the treatment by them adopted; it is also recommended, that they avoid crowding their paper with details of printed and easily accessible cases.

The letters accompanying the unsuccessful Dissertations will be destroyed by the Trustees, unopened, and the Dissertations may be procured by their respective authors, from the Trustee to whom they were directed, if application be made therefor within three months from the Society's annual meeting; but all such as remain uncalled for, after the expiration of the time here specified, will be considered as property of the Society, to be disposed of in such manner as the Trustees may deem most advisable.

RICHMOND BROWNELL, Providence,

THEOPHILUS C. DUNN, Newport,

LEWIS L. MILLER, Providence,

Trustees of the Fiske Fund.

THOMAS H. WEBB, *Secretary.*

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